EXHIBIT “A-1”

Wright Group INCORPORATED
Fire Investigation & Forensic Engineering

125 Stanphyl Road Rear
Uxbridge, MA 01569
Tel (508) 749-3200
Fax (508) 749-3206
www.wgifire.com
info@wgifire.com

February 26, 2016

De Luca Levine
Three Valley Square, Suite 220
Blue Bell, PA 19422

Attn: Patrick Hughes

Insured:	Joseph & Ursy Vitale
Loss Location:	1812 Purdie Lane Maple Glen, PA 19002
Co. Claim #:	0339957135
Date of Loss:	9/4/14
Type of Loss:	Fire
WGI File #:	60294

INTRODUCTION:

Assignment

On February 13, 2015, Attorney Patrick Hughes of DeLuca Levine, LLC., contacted this office relative to a fire that occurred at the above-mentioned location and requested that we inspect the Electrolux clothes dryer recovered from the scene to determine if and how it caused this fire. Attorney Hughes further requested that we address the involvement of this appliance in the cause of the fire in a detailed report.

Background

A fire occurred at the home of Joseph and Ursy Vitale at 1812 Purdie Lane in Maple Glen, Pennsylvania on September 4, 2014. Fire Investigator A. John Fry of McGinley Associates conducted a fire scene examination on September 8, 2014. Investigator Fry determined that the fire originated within the clothes dryer. A joint inspection of the scene was conducted by Investigator Fry and Brian Canova of O'Neill Associates was the O&C expert present for Electrolux. The subject clothes dryer, dryer venting and a laundry load sample were collected from the scene on this same date. The load sample was sent to Forensic and Scientific Testing, Inc. (FAST) for chemical analysis by Investigator Fry. A copy of the lab report was provided for review and their findings will be discussed later in this report.

The subject clothes dryer and related evidence was received by the Wright Group laboratory on March 19, 2015. The Wright Group conducted a non-destructive examination of the evidence involved in the above captioned loss on March 25, 2015. All evidence was examined, labeled and packaged accordingly. A joint examination of the evidence was conducted on May 12, 2015, at the Wright Group's laboratory in Uxbridge, Massachusetts. Present were Randall Bills of Scientific Engineering Analysis, Inc. (S.E.A.), expert for Electrolux, and Plaintiff's expert was Michael Stoddard of the Wright Group, Inc. This joint examination of evidence was conducted using an evidence examination protocol discussed and accepted by all parties.

Appliance Description

The appliance is a freestanding gas-fired clothes dryer manufactured by Electrolux and sold under the General Electric (GE) brand name. The label on the appliance was consumed, making it impossible to determine the model or serial number. It is our understanding that Electrolux was also not able to determine the model or model family of this dryer based upon either their inspection of the subject dryer or any records in their possession. The date code stamped on the dryer cabinet is GMD. This indicates the dryer was manufactured in June of 2004.

Methodology

The basic methodology utilized by this author in the investigation of this fire is outlined in NFPA 921 Guide for Fire and Explosion Investigations, 2014 edition. The basic methodology utilizes the scientific method as outlined in Chapter 4 of NFPA 921. Section 3.3.149 defines the scientific method as "The systematic pursuit of knowledge involving the recognition and definition of a problem; the collection of data through observation and experimentation; analysis of the data; the formulation, evaluation and testing of a hypothesis; and, when possible, the selection of a final hypothesis." The use of the scientific method during fire investigation analysis is mandated by NFPA 1033, Professional Qualifications for Fire Investigator.

The problem was defined as to determine the cause of the fire and to determine whether the subject Electrolux dryer was involved in the fire cause and/or to identify a sub-component within the Electrolux dryer that is related to the fire cause. To accomplish this, data was collected in many forms. That data was analyzed. From the analysis of the data, hypothesis were developed and tested. A peer review procedure was utilized throughout this process in this manner. Conclusions would then be formed with the final hypothesis selected as to the origin and cause of the fire.

To determine the cause of the fire, the competent heat source that caused ignition of the available fuel as well as the first fuel were identified. Further, this portion of the analysis addresses the

factors that brought the ignition source and the first fuel together. NFPA 921, 2014 Edition, Section 19.1.1 states:

> *The determination of the cause of a fire requires the identification of those factors that were necessary for the fire to have occurred. Those factors include the presence of a competent ignition source, the type and form of the first fuel ignited, and the circumstances, such as failures or human actions, that allowed the factors to come together and start the fire.*

According to NFPA 921, and all other teachings known to this writer, a credible cause determination is based upon all of the available evidence and is achieved through the convincing elimination of all other reasonable potential causes within the appliance of origin, given that the only remaining causation factor is consistent with all known facts. This analysis of the potential ignition sources within the subject appliance is considered in light of all of the information provided to date and their relationship to ignition and fire dynamic principles.

Executive Summary:

Our investigation revealed that the fire originated within the Electrolux dryer manufactured using what Electrolux refers to as the "Ball-Hitch" design. The ignition source was the flame and/or hot gasses produced by the gas fired burner. The first fuel ignited was lint collected within the heater pan mounted to the rear wall of the dryer cabinet, located directly behind the drum. The ignition event was the direct result of the first fuel (lint) coming into contact with a competent heat source (flame/gasses from the gas burner). The lint ignited in the area between the burner and rear of the drum was carried through the dryer drum and ignited additional lint that was collected in the area of the lint trap duct assembly to the front of the drum. The lint screen, trap duct and blower assembly components are made of plastics that provided additional fuels once ignited by the burning lint, as the majority of these components have no flame retardants added. The fuel load of the internal plastic components in the base of the dryer cabinet resulted in sufficient heat energy to melt and compromise the gas valve on the burner, releasing natural gas

in an unregulated manner during the fire. The internal fuel load of the dryer and design of the dryer cabinet enabled fire to spread out of the dryer cabinet to adjacent combustibles.

This fire event occurred because the defective design of the subject Electrolux dryer. The Electrolux Ball-Hitch design dryer allows lint to collect behind the dryer's drum in direct proximity to the heat source where it is neither visible nor accessible by the user and allows for the lint to be ignited. The design is also defective because of its failure to confine the fire within the appliance, as the use of plastic components assists in communicating fire out of the appliance where it can ignite surrounding combustibles. The design is also defective because Electrolux failed to warn of this danger or instruct on proper use and maintenance of this product.

The design and warning of the subject dryer was unreasonably dangerous and defective for the following reasons:

- Electrolux knew or should have known that the clothing in the drum and the lint that collects within dryers are combustible and that the gas heat source within the dryer has sufficient heat energy to ignite these combustible materials.
- Electrolux failed to separate potential ignition sources from the first fuels within the dryer through the use of a more appropriate and safer dryer design used by other manufacturers (Bulkhead design), as opposed to the subject Ball-Hitch dryer design.
- Electrolux adopted the Ball-Hitch design that allowed lint to collect behind the drum in close proximity to the dryer heat source. Instead, Electrolux should have adopted the Bulkhead style design, which does not allow the lint to collect behind the drum in close proximity to the dryer heat source. This alternative Bulkhead design was available at the time the subject clothes dryer was manufactured, as other manufacturers have used it for over 50 years. Beginning in mid-2008, Electrolux began manufacturing dryers that use the Bulkhead style design from their Juarez, Mexico plant. As of March 2011, Electrolux shut down their Webster City, Iowa, plant and henceforth no longer produces any Ball-Hitch style dryers like the defective dryer at issue.
- Electrolux breached the duty of basic Safety Engineering principals by not properly designing adequate guards or safety devices in their existing Ball-Hitch dryer design to protect against known flaws in the safety of the subject design.

- A simple design change, by installing an engineered guard in the heater pan of the gas dryer design, would further separate the lint that is known to accumulate in the heater pan and on the rear of the drum from the gas burner. This design change would significantly reduce the known risk of fires caused by the ignition of lint by the heat source by the accepted principle of safeguarding.
- Simple design changes, such as replacing plastic components with steel components, or by using plastics with higher degrees of fire resistance ratings would have reduced the potential for burning lint or clothing to ignite those components as well as reducing growth fuels that allow the fire to grow and spread from the cabinet. Electrolux has tested fire containment of drum fires per GE's requirements that dryers made under the GE brand name must pass GE's SEE test. The SEE test was a test protocol that had been in use at General Electric for years, dating back to at least the early 1990's when general Electric was manufacturing their own dryers at GE's Appliance Park in Kentucky.
- Based upon fire containment testing in the mid-late 1990s using the GE SEE test protocol, Electrolux found that molten plastic escaped the cabinet during testing. Even with these results, Electrolux manufactured their dryers using a large amount of non-flame retardant plastics that met only the minimum specifications of the voluntary standards. Conversely, GE required Electrolux to use plastics with better fire resistive properties in the GE branded dryers based upon the same fire containment testing, even though Electrolux chose not to in their own dryers. This displays gross negligence on Electrolux's part, as they chose to only make materials changes when required by GE in the small volume of dryers they manufactured for GE; they failed to make any materials changes to the larger population of dryers manufactured under several other brand names.
- This GE branded dryer was manufactured by Electrolux using a plastic trap duct molded using V0 burn-rated plastic that contained flame retardants. Changing the material of the trap duct alone satisfied GE's requirements to contain a drum fire under conditions of GE's SEE test using a set size and number of towels, a certain quantity of alcohol and tested in a brand new dryer with no lint inside to serve as addition fuels. However, Electrolux failed to account for the possibility of a fire that developed elsewhere within the cabinet in a dryer that has been in use in the field and that developed an accumulation of lint within the dryer during usage, as is reasonably foreseeable. Had Electrolux tested

a base fire containment scenario, it is most probable to a reasonable degree of scientific certainty that they would have found that fire would have escaped containment of the cabinet, even in the GE models with the flame-retardant plastic trap ducts. Furthermore, there is nothing to indicate that Electrolux considered conducting any base-fire containment tests in gas models with a constant supply of natural gas to investigate the effects of burning internal components may have on the gas valve for the burner assembly or its gas supply piping.

- Electrolux was part of discussions with all major dryer manufacturers under the Association of Home Appliance Manufacturers (AHAM) organization dating back to the early 2000s, during which discussion of fire containment concerns and the development of new testing standards specifically for fire containment. Electrolux was also privy to discussions for years preceding the publication of the fire containment test procedures for base fires and drum fires that were published in Underwriter's Laboratories UL 2158 Electric Clothes Dryer voluntary standard in 2009. Electrolux conducted no such fire containment testing until after the minimum voluntary standards were updated to require fire containment testing. Even then, Electrolux did not conduct any fire containment testing on the freestanding Ball-Hitch dryers they manufactured, including the subject model. They did test their newer alternative bulkhead dryers and also the Ball-Hitch Laundry Centers, which were also previously equipped with flame-retardant trap ducts. Electrolux ultimately had to make materials and design changes to both the Bulkhead freestanding dryers and the Ball-Hitch Laundry Centers in order for those units to pass the UL 2158 fire containment tests that they were required to meet or exceed in 2013.
- Electrolux failed to change the non-flame-retardant plastic components in the GE freestanding Ball-Hitch clothes dryer, including the blower housing and fan in the base of the cabinet adjacent to the trap duct. Electrolux could have used metal, thermoset plastics that do not significantly add to the fuel load, or even flame-retardant plastic like they used in the trap duct of these GE models to reduce the risk of fire escaping the dryer cabinet.
- Electrolux also failed to follow the engineering principals of Safety Engineering by placing the burden of hazard isolation on the user through the use of warnings and

instructions, in place of redesigning the product to eliminate the hazard or installing engineered guards and/or safeties.

- The use of warning labels and user instructions should never be the primary preventative measure in regards to fire safety.
- Electrolux generally relies upon an instruction to the user found only in their manuals that the interior of the dryer cabinet and exhaust should be cleaned periodically by a service person. Electrolux is not consistent with the specific language they use to instruct the user. In most manuals, Electrolux recommends an 18 month cleaning period. However, for GE dryers that are essentially the same design, the GE specific manuals recommend a 12 month cleaning period. Electrolux also interchangeably uses the terms "authorized servicer" and "qualified service personnel" to describe the person who should be conducting this service. It is unknown why there are differences between the instructions in the various Ball-Hitch dryer manuals, when the basis of the design is the same.
- The Electrolux Ball-Hitch dryer at issue did not have an instruction or warning on the appliance regarding the 12-month cleaning recommendation, specific to the GE models they produced.
- There is no user instruction or warning in the product literature to the user to inform them that lint accumulates behind the drum in proximity to the heat source in areas that cannot be observed by the user, and that the lint that accumulates in this area poses a significant risk of fire.
- Safety devices, such as an airflow monitoring system or an operational cycle counter with a reminder light to service the dryer after a specific number of uses could have been employed to actively notify the user as to the need for service and as a safety device to prevent fires should the need for service be ignored. This technology has been in use in other applications for over thirty years. The components were available and such designs were feasible at the time the subject dryer was manufactured.
- Electrolux did not instruct users or service technicians how to conduct the recommended regular maintenance of their dryers. The Service Manual for 27" Gas and Electric dryers authored by Electrolux for use with the maintenance of their dryers does not contain any instructions on the steps necessary to conduct the 18-month maintenance recommended to prevent lint fires (or 12-month in the case of GE dryers).

- Electrolux was aware that the dryer was manufactured in a time period when the front felt on the drum seal was found deficient. Electrolux was aware that leaking internal seals caused or contributed to reduced airflow through the dryer and resulted in increased lint accumulation within the dryer.
- The Electrolux Ball-Hitch dryer at issue did not have a permanent instruction or warning on the appliance, to advise that flexible foil duct materials should not be used in the ventilation of the dryer.

Review of Fire Incident Reports, Fire Marshal's Report and Photographs:

The Fort Washington Fire Company Fire Incident Report[1], Upper Dublin Township Department of Fire Services Fire Incident Report[2] and Upper Dublin Fire Marshal's scene photographs[3] were reviewed. The fire was reported at 18:16 on September 4, 2014. The first arriving fire department unit arrived at 18:25. The Origin of Fire was the "Dryer unit of combination washer/dryer unit." The Cause of Fire was "MALFUNCTION OF LAUNDRY DRYER (NATURAL GAS)".

Fire Marshal Timothy Schuck's report provided a summary of his interview of the homeowners and a summary of his findings during his investigation. Fire Marshal Schuck reported that "*On the day of the fire, Mrs. Vitale said that she had used the natural gas dryer numerous times with no problems along with cleaning out the lint trap after each load. Mrs. Vitale had placed a load of children clothes in dryer and was in the kitchen making dinner. Approximately 15 minutes later, she started to detect an odor of something burning. She looked around the house for the source of the odor and as she opened the door to the laundry room she observed a haze inside the room. Mrs. Vitale then opened the dryer door and started to remove the clothes from inside of the dryer when she noticed a red glow inside of the clothes. She then left the room to get*

[1] See Forth Washington Fire Company Fire Incident Report, #1424295
[2] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295
[3] See Upper Dublin Township Fire Marshal Photographs

a fire extinguisher and upon her return to the laundry room, there was even more smoke in the room. Again, she started to pull the clothes out of the dryer and then saw flames inside of the dryer. The smoke in the laundry room started to get blacker, at which time Mrs. Vitale decided it was time to get out of the house, exiting the laundry room and leaving the dryer door open. She gathered her three children and called 911 from the outside of the home."[4] "*The Vitale's stated both the washer & dryer were left in the home by the previous owners. They purchased the dwelling in 2010. Mr. Vitale stated that he believed the unit was a Maytag brand. The washing machine is a Maytag.*"[5]

Fire Marshal Schuck reported "*The fire was contained to the laundry room, with severe to moderate smoke damage throughout the rest of the house. The dryer was documented in place with photographs, then the gas and electrical were secured and the unit removed to the exterior. The fire patterns on the dryer indicated that there was a low fire below the drum with fire damage extending up through the drum to the top of the unit. Due to fire damage, the make and model of this natural gas dryer could not be determined. The fire was able to extend outside of the dryer into the room due to the door of the unit being open.*"[6] "*The dryer was removed to the backyard where it was covered by the restoration contractor for protection from the elements.*"[7] In respect to the building electrical system, he found "*The main electrical service panel was examined: One twenty amp circuit breaker was found in the tripped position. This breaker is located on the left side of the panel second from the bottom. The circuit breaker was turned off and the power to the rest of the house was restored.*"[8]

Fire Marshal Schuck summarized his opinions as to the origin and cause of the fire in his report. He concluded that, "*Utilizing the systemic approach along with a coordinated effort by the fire department, the area of origin was determined to be located in the natural gas laundry dryer.*

[4] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295
[5] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295
[6] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295
[7] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295
[8] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295

The ignition source was not determined at the time of this investigation. The first material ignited was synthetic fabric. The cause of this fire incident is Accidental in Nature."[9]

Review of the Fire Marshal's photographs show that the dryer was situated in the laundry room when he arrived, in the corner of the room. The dryer had already been pulled away from the wall and the top lid was dislodged during firefighting. The door was partly open in the Fire Marshal's photographs and he opened the drum door to photograph the interior of the drum. The interior of the drum had no load present at the time of the municipal investigation, only water from fire extinguishment. The firefighters had removed the washing machine from its position between the dryer and the utility sink. Firefighting efforts had also caused the exterior vent assembly to become separated, with the rigid metal duct torn from the metal vent hood. The duct pipe portion that passed through the wall was depicted in the photographs resting against the wall in the space behind the dryer. The exterior vent hood was not depicted in the photographs but the opening in the exterior wall behind the dryer was documented. Similarly, the firefighters had removed the flexible foil transition duct and, which was depicted on the floor to the right in the photographs.

When the Fire Marshal arrived, the door for the dryer portion of the Laundry Center was already open, with a fire hose inside the dryer's drum. The first photographs behind the appliance show that the semi-rigid aluminum transition duct had detached from the back of the dryer and was lying on the floor behind the unit. This vent duct traveled to the left where it curved upward to vent through the exterior wall. In this area, the corrugated aluminum material of the duct was dented, possibly from firefighting operations. The Laundry center was pulled away from the wall and the next photographs taken by the Fire Marshal show that the interior of the semi-rigid transition duct and the exhaust connection on the rear of the dryer were devoid of any lint blockage. There are no photographs that show the vent disconnected from the exterior vent connection. Further, the photographs show that the fire department removed from laundry from inside of the dryer drum and brought it outside, likely to ensure it was fully extinguished. The photographs also show the dryer was removed to the yard during the municipal investigation

[9] See Upper Dublin Township Department of Fire Services Fire Incident Report, #F14-24295

where additional photos of the dryer were taken. The Fire marshal also photographed the electrical panel in the home which showed the 20 Amp, single-pole circuit breaker for the laundry room in the tripped position.






Fire Department Photos

Review of McGinley Report and Photographs:

The Origin and Cause Investigation Report of A. John Fry of Patrick J McGinley Associates, Inc., authored on February 17, 2016 was reviewed. His initial investigation of the origin of the

fire occurred on September 8, 2014. Mr. Fry determined that the fire originated in the first floor laundry room from within the Electrolux gas-fired clothes dryer. Mr. Fry observed that "*The flexible aluminum ventilation hose and the wall mounted vent hood did not exhibit any appreciable fire damage and there was no indication of a blockage in the exterior exhaust duct work that would have impeded air discharge from the dryer's exhaust vent. The dryer was located adjacent to the north wall of the laundry and the exhaust ventilation system discharged through that same north wall approximately two feet (2') away from the dryer. This distance is clearly within the acceptable limits.*"[10] The cause of the fire within the clothes dryer was undetermined by Mr. Fry, pending laboratory analysis of the artifacts. As a result of his determination, a joint scene inspection was conducted with the O&C expert for Electrolux, Brian Canova of O'Neill Associates, on September 23, 2014. During this joint scene examination, they examined, documented and removed the clothes dryer's ventilation system.

Investigator Fry's interview of Mr. and Mrs. Vitale was also summarized in report. "*According to Mr. and Mrs. Vitale they purchased and moved into the residence in 2010 and had used the subject washer and dryer that had been left there by the prior owners. They stated that they did not have any operational issues with the dryer and to their knowledge no repairs were ever made to the appliance since they occupied the property… Mrs. Vitale related that on the date of the loss she was at home and while she was using the clothes dryer she smelled smoke. She promptly investigated the source of the smoke and determined that it was coming from the operating clothes dryer. Mrs. Vitale opened the dryer door and could observe a glow coming from below the dryer drum. At that time there was no evidence of any fire inside the clothing that was still inside the dryer. She stated that the fire was confined to the lower portion of the dryer below the drum. She evacuated the residence and called the Fire Department.*"[11]

The photographs taken by Investigator Fry on September 8, 2014 and on September 23, 2014 show the washer and dryer had already been removed to the backyard before his arrival. A pile of debris and a snow fence surrounded the area outside of the laundry room. Fire damage to the washing machine was primarily to the left side, from the direction of the clothes dryer to its left.

[10] See O&C Report of A. John Fry of Patrick J. McGinley Associates, Inc.
[11] See O&C Report of A. John Fry of Patrick J. McGinley Associates, Inc.

The washing machine was considerably less damaged than the clothes dryer and, as outlined in Mr. Fry's report, his examination of the washing machine on-scene allowed him to rule out that appliance as a potential fire cause. The clothes dryer was heavily damaged by fire and the clothing load had been mostly consumed or removed by firefighters. The dryer venting had also been removed by firefighters prior to Mr. Fry's first examination of the scene, with the flexible foil clothes dryer transition duct and the metal exterior hood found in the yard. The fire department had pried the metal hood from the short section of rigid piping that is normally attached to the vent assembly that passes through the wall. That item was not found by Mr. Fry. The hood had almost no lint accumulated in it and the flexible foil transition duct displayed only a light lint accumulation on the inner wall of the round duct.








O&C Photos

Load Sample Analysis:

Attached to Investigator Fry's report was a copy of the Certified Laboratory Report of Forensic and Scientific Testing, Inc. (FAST)[12]. This lab report summarized the findings from their testing of a representative sample of the laundry load Investigator Fry collected from the subject dryer during his examination of the scene. No ignitable liquids or fatty acids from vegetable oils were found in the load sample by FAST. The lack of any identifiable contaminates in the laundry load that was in the dryer drum at the time of the fire assists in eliminating any causes of the fire related to contamination of the drum load by ignitable liquids or materials prone to spontaneous combustion. This will be discussed further later in this report.

Depositions:

Review of Deposition of Ursy Vitale:

The following items were summarized from the deposition of the insured, Ursy Vitale, taken on December 23, 2015:

- They moved into the home at 1812 Purdie Lane in Maple Glen, Pennsylvania in June of 2010.
- She lives there with her husband Joseph and their three children. Currently her children are ages 10, 8 and 7.
- The fire occurred September 4, 2014.
- They also have a cat that lives with them in the home.
- She is not currently employed. She has been a stay-at-home mom for the last ten years.
- No one in the house is a smoker.
- When they first purchased the home they did some cosmetic upgrades which included kitchen cabinets and countertops. Her husband installed the cabinets. Colonial Marble installed the countertops. There was no electrical or other non-cosmetic work done in connection with the kitchen renovation. They have not done any other renovations since they purchased the house.

[12] See FAST Certified Laboratory Report, October 8, 2014, FAST, Inc., Case # FMG-10-26466

- They've had no issues with the house and nothing has needed to be repaired.
- The laundry room was located to the left of the kitchen on the first floor near the bathroom. There were two doors for the laundry room, one leading into the laundry room that was constructed of solid wood, and a door leading into the sun room on the back of the home that was made of wood with glass panes on the top half. The laundry room floor was covered or partly covered with linoleum at the time of the fire.
- The layout of the laundry room was such that when you entered there was a utility sink to the right side of the laundry room. When looking at that right hand side, the sink was in the corner, the washer to the left and the dryer in the opposite corner. There was also a closet opposite the sink and laundry appliances on the left side.
- She does not recall how much space there was between the washer and the dryer. The dryer was located in the corner with a wall behind it and a wall to its left. She does not recall how much space was between the left side of the dryer and the wall to its left. She estimated there was a minimum of 12" of clearance between the back of the dryer and the wall behind it.
- She did not store anything above the dryer; there was no shelving in the laundry room. She did not store anything around the dryer. She stored laundry detergent in the closet across from the laundry appliances.
- There was one window in the laundry room on the wall behind the laundry appliances. The window was situated above the utility sink and washing machine. It was a small window.
- She did not know details about the dryer venting but indicated her husband would be more familiar with that information. She handled the everyday use of the washer and dryer but her husband handled maintenance.
- She did not purchase the dryer; it came previously installed in the home when they purchased the property.
- She does not know how old the dryer was at the time they purchased the home.
- They did not negotiate or discuss including the washer and dryer as part of the home purchase. It was included already in the listing.
- The dryer was fully installed when they moved into the home and remained in the same position up to the day of the fire.
- They did not receive any kind of documentation in regards to the dryer when they purchased the home.
- She is the primary user of the dryer. She used the dryer every day, sometimes twice a day but most days, it was only used once.
- She would dry typical loads of laundry including her family's clothing, bath towels and things like that. No one in the home had any type of work uniforms that she dried.
- She did not have any specific type of detergent she used when doing laundry. It would vary depending on what was on sale. She sometimes used dryer sheets in the dryer, usually Bounce of Snuggle. She did not use any fabric softener in the washing machine.

- She did not know if the washing machine had some set load size amount. She would judge laundry load size from her years of experience doing laundry and would not overload the laundry appliances. She would dry medium size loads of laundry. She would never dryer large loads in the dryer.
- She did not experience any problems with the dryer prior to the day of the fire. She'd never found that her clothes were not drying quickly enough. She never observed any holes or damage to the fabric from the clothing that came out of the dryer.
- She would always clean the lint filter by removing the lint screen and cleaning the lint from it between every use. Sometimes she would also take a paper towel and clean inside of the drum itself. When she cleaned the lint screen she would remove the lint with her hand and made sure there was no lint remaining in the lint trap.
- She did not take the dryer apart in any way to clean other areas of the dryer.
- She would clean the exterior of the dryer and wipe down any dust. She would also sweep and vacuum around the laundry appliances two or three times a week. She would sweep around the dryer with a broom and collect the material in a dust pan. She also had a Dustbuster.
- She never moved the dryer away from the wall. She never personally disconnected any part of the dryer.
- She never had any dryer technician come to clean the dryer or work on the dryer in any way.
- When presented with Exhibit 2, the Owner's Manual and Installation Instructions for a GE dryer, she stated that she had never seen this manual before. She had not seen any kind of Owner's Manual or Installation Instructions for the dryer that was in their house. She did not recall receiving any kind of documentation when they purchased the home.
- When presented with Exhibit 3, the Checklist for Best Drying Performance, she had never seen this document before or any checklist such as this with any other dryer. She was familiar with some of the items listed on the checklist, including cleaning the lint filter before every drying cycle and making sure the duct work was not clogged.
- When presented with Exhibit 4, a drawing that depicted a label for use of the subject dryer in a pre-manufactured home, she was not familiar with this label. She did not recall seeing any stickers on the dryer. She never looked behind the dryer or sides of the dryer nor has she seen any stickers visible on the exterior of the dryer.
- At the time of the fire she was operating the dryer, drying her children's clothing and possibly a bath towel or two. She does not recall the exact size of the load.
- She does not recall if that was the first load she had dried that day or if she had dried a load previously.
- She put the load into the dryer and was making dinner for her kids when she began to smell smoke while she was in the kitchen. She looked around for the source for a minute and, knowing that she had clothes in the dryer, went into the laundry room. When she

opened the door to the laundry room she noticed a haze and she could tell something was wrong.

- She opened the door to the dryer and was looking around inside the drum. She saw a little bit of smoke come out and became alarmed.
- She went to look for a fire extinguisher. At that point, the smoke detectors started sounding which scared her children.
- When she walked back into the laundry room, it was staring to fill with black smoke. She was already talking to the fire department at this time and they instructed her to evacuate the home immediately.
- After she first opened the drum, she began moving the clothes around inside of the drum. That was when she saw flames coming out of the dryer. It was at that point that she went to go get the fire extinguisher.
- The flames she observed where shooting upward from the bottom. She did not recall exactly where she saw the flames.
- When she returned into the laundry room after retrieving the fire extinguisher she heard a weird noise followed by an increase of very thick black/grey smoke that was pouring out of the dryer. She could not describe the noise and has never heard that noise before.
- She recalled having a conversation with the fire department. They were concerned that everyone was out of the house. She also told them that her dryer had caught on fire. She also recalled speaking to someone from the fire department that wanted to investigate where the fire came from and how it started.
- She did not remember what happened to the dryer on the night of the fire. When she returned to the home a couple days later, the dryer was outside in their backyard.
- She is not aware that this type of dryer allows lint to collect in areas that are not visible to the user and near the heat source.
- Because she was not supplied with an Owner's Manual, she was not aware that the manufacturer recommended that the dryer should be completely disassembled and that lint should be cleaned out of the dryer by a qualified technician. If there was some sticker or warning on the dryer in a conspicuous place that instructed this, she would have followed that instruction.
- The lint filter was always in the dryer when she operated it.

Review of Deposition of Joseph Vitale:

The following items were summarized from the deposition of the insured, Joseph Vitale, taken on December 23, 2015:

- He works in outside construction for Verizon Communications and has worked for Verizon for nineteen years. He went to school for automotive technology and also worked in the automotive field for two or three years after college.
- He agreed with his wife's description of the layout of the laundry room. He corrected that the clearance behind the dryer was approximately 8" to 12" with enough room so that the flexible vent pipe had clearance. The wall behind the dryer was the back wall of the home. He estimated there was approximately 6" of space between the washer and dryer and 6" to 8" of space between the left side of the dryer and the wall to the left.
- The dryer vent included a flexible hose, not a rigid hose. He did not recall the exact type of material that the flexible transition duct was made of. He took the exhaust apart to examine it when he cleaned it out and made sure there was no dry rot on the flexible material. The flexible hose connected from the dryer to the exterior vent using two clamps.
- The exterior vent passed through the exterior wall directly behind the dryer. This was the back wall of the home. He estimated that the exterior vent passed through the wall approximately 12" below the height of the dryer's controls, behind the dryer.
- The exterior vent had a flap on the outside, which he deemed as "proper venting". He purchased the exterior vent from Lowes. He replaced this approximately one year before the fire. The original exterior dryer vent that passed through the wall was a lighter material. He felt the exterior vent that he replaced the original with was an upgrade because it was heavier duty rigid material. The section of pipe that passed through the wall was connected to the hood and purchased as an assembly.
- He personally replaced the exterior vent and pipe that passed through the wall. To do this he pulled the dryer out. While the dryer was removed he cleaned the interior of the flexible transition duct after removing the flexible duct by disconnecting each of the two clamps. When he reinstalled the venting he made sure there were no air gaps or leaks. He also inspected the flexible transition duct to make sure it was not rotted, bent and to make sure there was nothing inside. He made sure the steel coil was still in place. After he replaced the exterior vent hood and reinstalled the original transition duct, he operated the dryer and went outside to make sure there was good airflow coming out.
- He only replaced the exterior vent once in the home and did not replace the flexible venting in the home at this or any other time. He had probably replaced venting one time in his old house on the other dryer they had there.

- He would have had the instructions that came with the exterior hood assembly that he referred to when he replaced it. The directions came in the box with the assembly he purchased from Lowes.
- He did not speak with anyone from Lowes about what type of venting he should use. He decided on what type of exterior vent by choosing the one that looked pretty standard. The vent components he replaced were standard size.
- He confirmed that he did not replace the flexible hose on the back of the dryer. He only replaced the exterior vent, including the louver and the piece inside the wall. He only replaced these because he considered it an upgrade and wanted to make sure the venting was in good condition. He did not remember why he wanted to upgrade the venting.
- When he took apart the vent system, he cleaned the flexible transition duct hose with a vacuum cleaner. He also inspected the flexible duct for its condition and to make sure there were no leaks. He cleaned the flexible foil duct and inspected it in the same manner probably once a year.
- He did not recall having any problems with the dryer prior to the fire.
- He did not use the dryer. The only time he ever operated the dryer was to check the airflow and make sure there was good airflow after he cleaned the venting.
- He did not have any kind of technician come to repair the dryer or clean the dryer in any way.
- He does not recall receiving any literature with the dryer and did not recall seeing any stickers on the dryer.
- He was not home on the day of the fire.
- He does not recall anyone from the fire department telling him anything about the cause of the fire.
- He does not know what happened to the dryer after the fire. He did see it outside in the backyard after the fire.

Subject Evidence Examination:

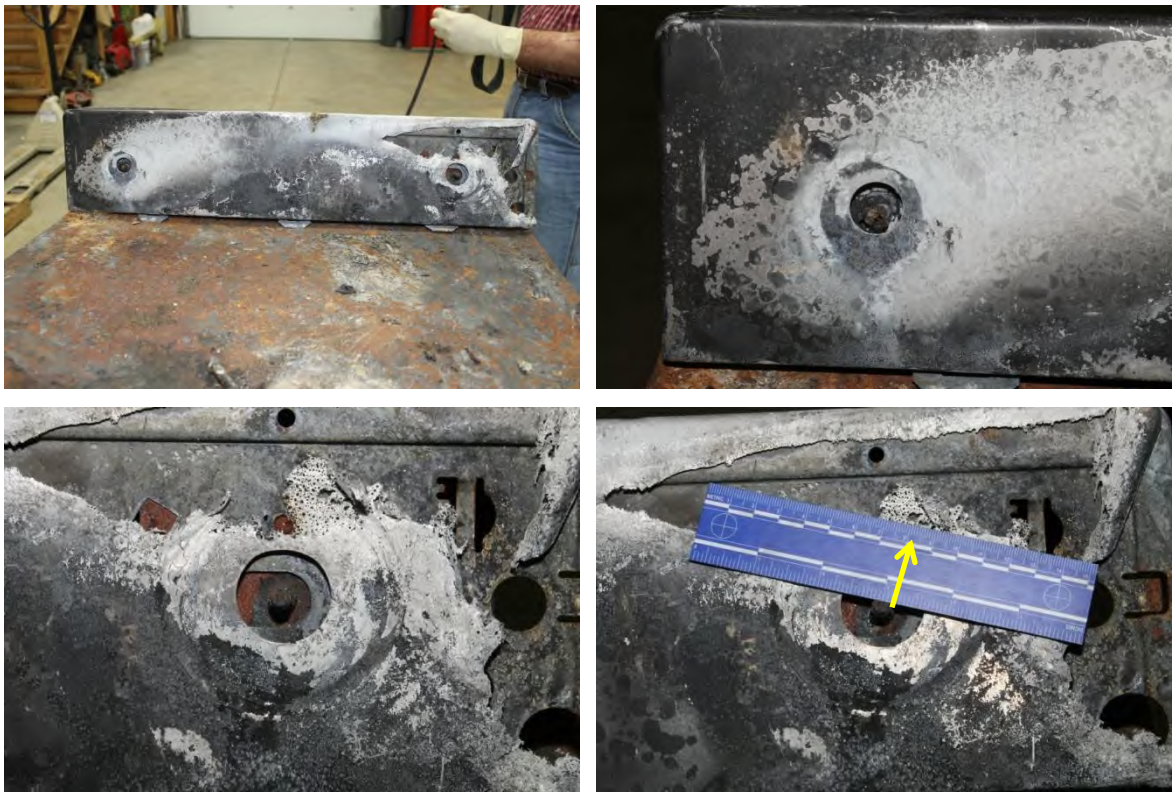
The exterior examination of the dryer revealed heat damage and oxidation patterns to the right front corner of the appliance consistent with the plastic trap duct/blower housing being consumed during the fire. The left side of the cabinet also displayed heat damage but the paint was still partly intact at the bottom-left. The top lid was oxidized most heavily at the right front corner. The rear of the cabinet has heat damage to the paint. All exterior fire patterns are consistent with the fire originating within the dryer.

Exterior of Subject Dryer

Examination of the rear of the dryer revealed the power cord terminal cover was intact and in place. The 120V power cord was still attached to the cabinet. The insulation on the cord was partly consumed in some areas, including the strain relief at the cabinet. The plug end had only minor melting to the exterior. There was no electrical activity observed on the power cord conductors.

Power Cord

The top mounted control console was heat damaged and both of the plastic end caps were consumed. The Timer and Start switch knobs were both consumed. The console was marked with the "GE" label and had the curved front unique to all Electrolux-manufactured freestanding GE dryers. The part number on the console was consumed, which did not assist in identifying the dryer model. The Timer shaft was loose and the shaft position was indexed toward the 1 o'clock position. The interior of the top mounted control console revealed that the switch bodies were damaged during the fire and the Timer could not be tested to verify if the dryer was running at the time of the fire. The insulation on the conductors in this area was completely consumed. There was no electrical activity observed on the conductors within the control console.



Control Console & Timer Shaft Position

Interior of the Control Console

The paint on the interior of the door was mostly intact whereas the paint on the drum opening had been consumed and the front panel heavily oxidized. This indicated the door was open during the fire. The door gasket had been only partly consumed. The door switch had been consumed during the fire. The door catches at either side of the drum opening were consumed. The plastic lint trap at the lower portion of the drum opening had been consumed. The manufacturer's labeling around the drum opening was consumed and both the model and serial number were not legible. Although it was not present during the joint evidence exam, the

insured had retained the lint screen from the lint trap at the front of the drum opening after the fire. Inspection of the lint screen revealed that the nylon screen material had some soot discoloration and the plastic frame was deformed from heat. Both sides displayed this type of damage and are consistent with the lint screen being in the dryer at the time of the fire and removed during fire discovery. Had the lint screen been left out during the last drying cycle, the downward facing side would have been protected against whatever the lint screen was laid upon.

Drum Opening

Interior of Door

Label

Lint Trap

Lint Screen Removed from Dryer during Fire Discovery

The interior of the drum had heavy heat damage. All three of the plastic drum paddles were consumed. A load line was observed in the drum at the 10 o'clock position that indicated the drum had been rotated post-fire. The remains of the load had been mostly removed and preserved in a metal can at the fire scene. However, the burned cloth remains in the drum at the time of inspection included purple cotton blend cloths reminiscent of t-shirt materials and white terrycloth consistent with towel. The fire patterns on the cabinet surrounding the drum were not consistent with a fire that originated in the drum load. Additionally, the witness testimony does not support that the fire was caused by spontaneous ignition, as the dryer was running at the time of the fire.

Interior of the Drum

Laundry Load Remains

The top panel was removed and the belt was consumed. Both of the OEM screws fastening the front panel to the cabinet were in place. The insulation had been consumed from the upper electrical harness and a portion of the harness had broken away and dropped into the base of the

dryer cabinet. No electrical activity was observed on the stranded copper conductors remaining in the upper cabinet.

Upper Cabinet and Upper Wiring Harness

The front panel was removed from the dryer to allow further inspection of the interior of the front panel. The plastic trap duct had been consumed. Although the plastic trap ducts in the GE models were flame-retardant, the surrounding fuels in the dryer that burned allowed this plastic component to be consumed during the fire. The felt and plastic components of the front drum seal were entirely consumed. Due to the front seal components being consumed, it was impossible to determine the amount of wear to the felt material prior to the fire. Similarly, the foam that sealed the plastic trap duct to the plastic blower housing had been consumed during the fire, making it impossible to rule out a potential seal leak at this interface. It should be noted that based upon the subject dryer's date of manufacture in July of 2004, the subject dryer was the subject of a Technical Service Bulletins[13] issued from December 2004 through May 2005

[13] See Appendix II, Electrolux Service Bulletin, December 2004

covering dryers manufactured from 2002 to 2004 that cited a problem with the front drum seal felt being changed to a different blend, which could compress and lead to zippers, buttons and other items being lodged in the front drum seal. More importantly, later versions of these Technical Service Bulletins, for dryers manufactured from 2006-2008, discussing this felt seal variation also list "Poor Airflow" as a problem that these dryers will experience. This will be covered later in this report and all Technical Service Bulletins for these Ball-Hitch dryers are contained in Appendix II. This made it likely that internal seal leak(s) were a contributing factor of reduced airflow and subsequent lint accumulation.

Front Panel

The drum was removed from the cabinet. The rear of the drum was not equipped with a heat shield or "baffle", common on newer vintages of Electrolux Ball-Hitch gas-fired dryers. There was no lint adhered to the rear wall of the drum surrounding the numerous perforations after the fire. While it is common that lint collects on the rear of the drum in the Ball-Hitch dryer design, any such lint would have been consumed during the fire. Examination of the ball pivot shaft revealed it was undamaged, with no evidence of scoring from metal on metal contact.

Rear of the Drum

Examination of the interior of the cabinet reveals that the plastic blower housing and fan impeller were consumed. This damage was consistent with the fire patterns observed on the exterior of the dryer and was caused by the internal plastic fuel load at the lower right front corner. There was no evidence of lint within the base of the cabinet post-fire. The lack of any significant accumulation of charred lint at the front of the burner assembly provided no evidence to support the ignition of lint due to encroachment into the burner assembly or anywhere else in the base of the cabinet.

Interior of Cabinet

Examination of the remainder of the wiring harness revealed that the insulation on the lower portion of the wiring harness in the cabinet consumed and much of the harness had broken and fallen into the base of the cabinet. There was no electrical activity observed on any of the lower harness conductors or loose conductors recovered from the lower portion of the cabinet interior. None of the stranded copper conductors had any visible beading or other evidence of electrical activity. Electrolux's expert did not want to fully remove the harness to further inspect for any possible arcing or other evidence of electrical activity.

Wiring Harness

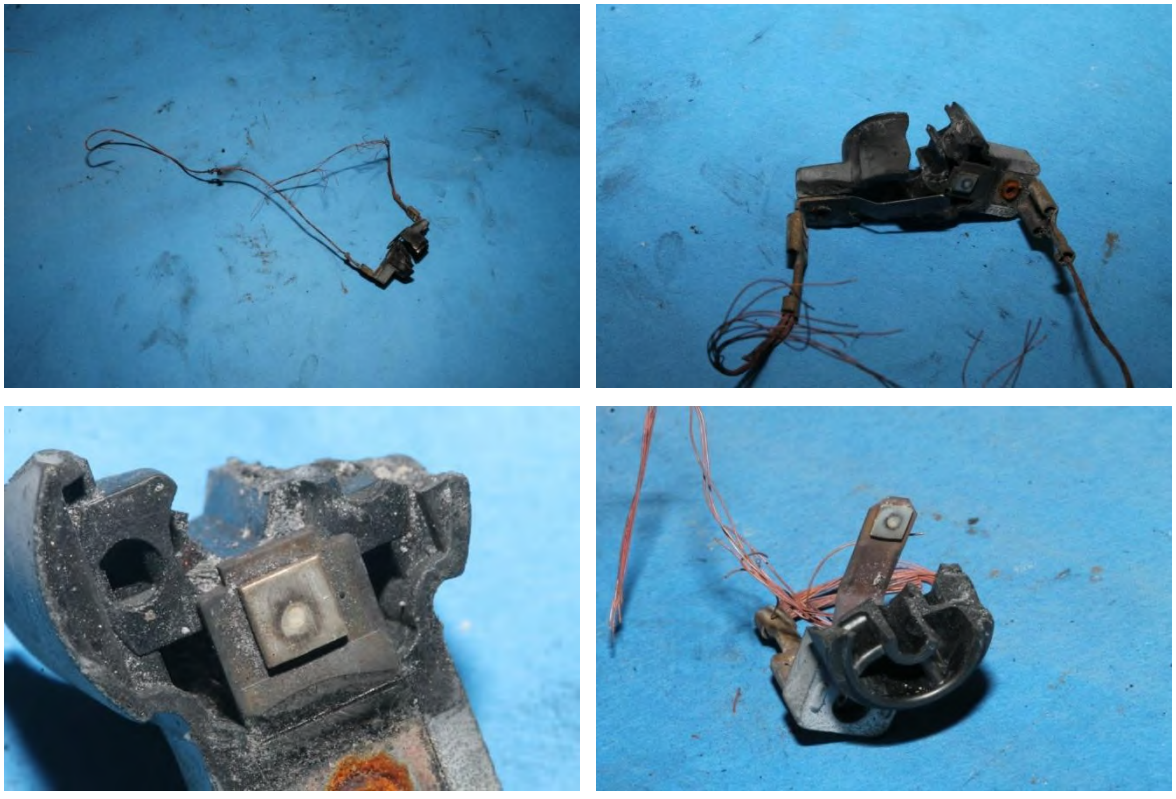
Examination of the motor revealed that the aluminum frame was heavily melted. There was no accumulation of lint on the motor post-fire. There was no evidence of electrical activity on the windings or the attached conductors, only melting from heat exposure. The front motor bearing had been damaged by fire and the shaft could not be rotated. The centrifugal switch was consumed during the fire and could not be manually tested for operation during the joint evidence exam.

Motor

Examination of the operational thermostat revealed that it was destroyed when the blower housing that it was mounted to was consumed by fire. The operational thermostat was not functionally tested. Examination of the automatic resettable high limit safety switch from the one o'clock position of the heater pan revealed that it was also destroyed during the fire and the remains were found in the base of the dryer cabinet. The automatic resettable high limit safety switch could not be tested on account of the damage. A visual inspection of the contact surfaces revealed that evidence of repeated cycling was observed on the contacts. The contact surface displayed some arc marks and discoloration in a circular pattern at the center; however, there were no deformations or craters to the surface of either the fixed or moveable contacts. There was no evidence that the safety switch had welded or fused together. Based upon the physical evidence it was determined that the automatic resettable high limit safety switch had operated repeatedly over the lifetime of dryer use due to elevated temperatures behind the drum from a reduction of airflow within the dryer. Numerous factors can cause the dryer to cycle off of the high limit safety, all of which are related to reduced airflow. These could include a restricted exhaust, large loads, leaking internal seals, a blocked lint screen, etc., or any combination thereof. Numerous Electrolux service documents also list numerous causal factors that cause the high limit switch to operate, above and beyond those related to the failure to install and properly maintain dryer venting, which is almost universally one of Electrolux's experts' defenses in these

cases.[14] There is no way to reliably determine if any one of these factors was the sole cause. Furthermore, all of these conditions are foreseeable, hence the need for a thermal safety device(s) in all residential clothes dryer. Further discussion will follow later in this report.

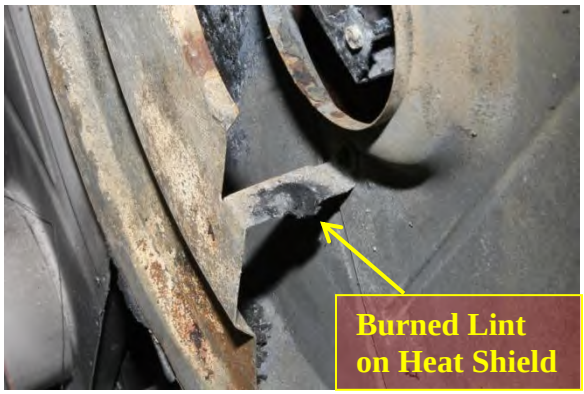
Operational Thermostat at Blower Housing

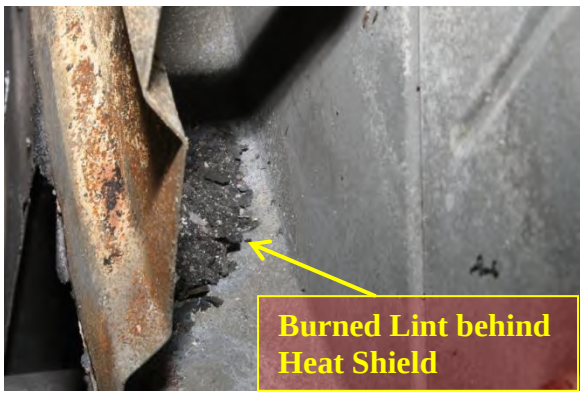


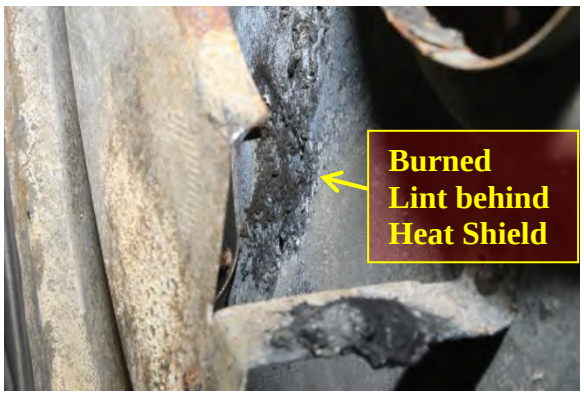
High Limit Safety Switch

[14] See Electrolux's Technical Service Bulletin, Vol. 20, #11, November 2000, Electrolux Operating Instructions for all "Good and Better" Model Electronic Console Clothes Dryers, Dryer Tech Data Sheets supplied with all "Good and Better" Model Electronic Console Clothes Dryers and January 2005 Service Manual for all "Good and Better" Model Electronic Console Clothes Dryers, P/N 5995420543, Pg. 51-52

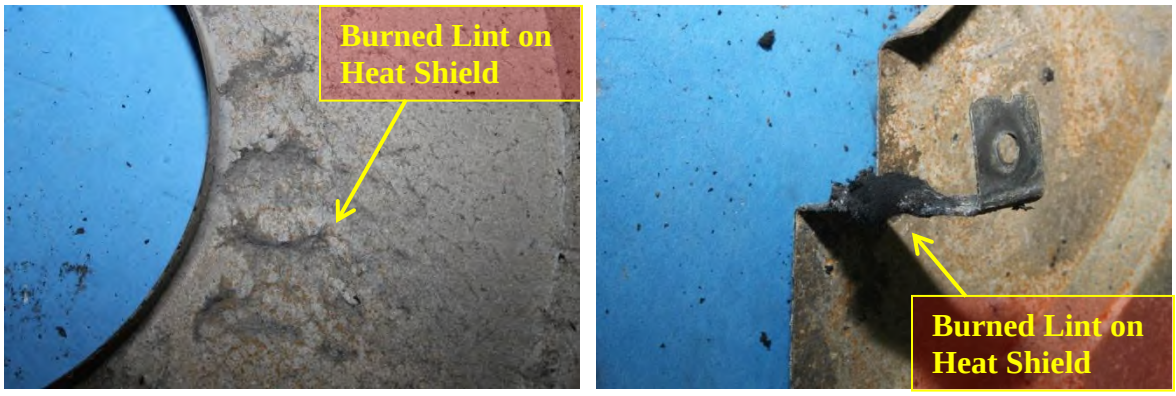
Examination of the heater pan mounted to the rear of the cabinet revealed it was equipped with the unique sheet metal heat shield that GE required Electrolux to install on all gas dryer manufactured for them. This is a half-moon shaped heat shield which bolts to the left side of the heater pan. The heater pan assembly, including the heat shield had sustained heavy heat and oxidation damage during the fire. The rear felt drum seal attached around the outside edge of the heater pan had been mostly consumed during the fire. A minor accumulation of burned lint was present within the heater pan and on the surfaces of the heat shield post-fire. There was burned lint on the top surface of the sheet metal offset which secured the heat shield to the vertical face of the heater pan below the Ball-Hitch opening and hitch assembly. There was also burned lint on the vertical face of the pan and on the rear of the heat shield directly above the opening where the vertical heat duct opened into the heater pan. Witness marks were observed at the lower portion of the heater pan that indicated that there had been an approximately 3-4" deep accumulation of lint at the six o'clock position of the heater pan. While the majority of this lint had been consumed during the fire, a mass of burned lint was retrieved from the cabinet below the heater pan and was reconstructed in its location at the time of the fire. After the fire, this mass of burned lint was approximately 1" deep, 5" long and fit the 2 ¼" width of the heater pan. Based upon the witness marks, this lint in the lower portion of the heater pan extended to the heat duct opening at the 7 o'clock position, where the heat from the burner enters the heater pan, to 4 o'clock position at the right edge of the heater pan. The normal operating temperature at the point where this lint was collected where the heater pan intersected with the vertical heat duct that carries the hot air from the burner assembly dryer in a dryer that is installed to manufacturer installation instructions is over 1000°F, well above the approximate 700°F ignition temperature of lint. The lint (first fuel) accumulated within the void space formed between the rear of the drum and the heater pan is in proximity to the heat source (burner flame), in a position where it is at high risk of ignition, and was determined to be the first fuel ignited.





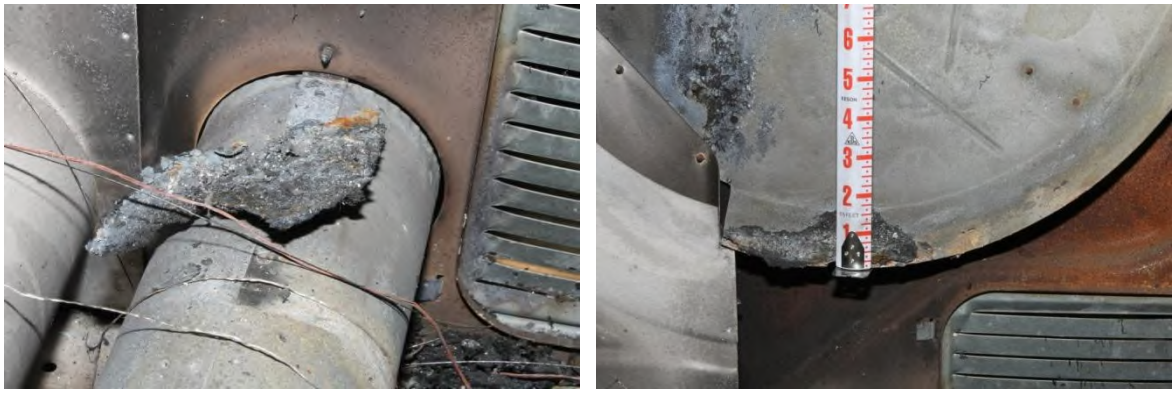


Heater Pan and Heat Shield



Rear of Heat Shield Removed

Heater Pan with Heat Shield Removed



Mass of Lint Dislodged from Lower Portion of Heater Pan

The gas burner assembly at the lower left of the cabinet was inspected. The gas valve was visibly melted, evidence that the alloy valve body had melted during the fire and allowed natural gas to escape during the fire. This unchecked release of fuel gas caused much of the intense fire damage within the dryer. The gas valve was compromised because of the internal plastics of the dryer generating sufficient heat to melt the gas valve body during the fire, after they were ignited from burning lint that had traveled from the heater pan, through the drum and into the lint trap area. Examination of the combustion chamber and gas burner assembly also revealed that these components had no lint accumulated on them; any lint that may have been accumulated in this area prior to the fire had been consumed. The gas train was removed for further examination and the burner assembly was found to be equipped with a size 44 orifice, which is appropriate for natural gas. With the burner assembly removed, some fire debris, burned cloth, melted aluminum from the motor frame and a drum paddle screw were found to the rear of the combustion chamber at the base of the vertical heat duct where it had intersected with the tube of the combustion chamber where the flame was located. These items had all migrated into the vertical heat duct post-fire. While it is possible that a piece of lint had fallen down in this area during operation and was the first fuel ignited in the combustion chamber, any available post-fire patterns would have been destroyed or obscured due to the heavy fire damage within the dryer cabinet. Therefore, it is just as probable that the first lint ignited could have been within the heater pan at the top of this vertical heat duct. Regardless of the exact point of first ignition, the lint that collected in the path of airflow between the gas burner and the rear of the drum was the first material ignited in this fire.

Gas Burner Assembly

Intersection of Combustion Chamber and Vertical Heat Duct and Post-Fire Debris

The majority of the venting for the dryer was included as evidence. As discussed in review of the Origin & Cause Investigator's scene photographs, the clothes dryer transition duct was and the exterior vent hood were recovered, but the short rigid metal duct pipe that was part of the hood assembly had been removed by firefighters and was not collected during the joint scene examination. The transition duct that connected the dryer to the permanently installed duct was a UL Listed Clothes Dryer Transition Duct constructed of flexible foil, comprised of 101 wire coils and measuring approximately 4'6" in length at rest. The interior of the flexible foil transition duct contained a light layer of lint and was not blocked or obstructed. The coils of the duct were distorted in three distinct areas consistent with post-fire damage but there was nothing to indicate that the transition duct had been kinked, crushed or otherwise damaged prior to the fire. The label indicated the transition duct was manufactured in March of 2004, indicating it was originally installed with the subject dryer. This was consistent with the Mr. Vitale's testimony. While the Installation Instructions for this dryer did not recommend the use of flexible foil ducting anywhere in the vent system, there was no physical evidence that the simple use of this short section of foil transition duct was a substantial contributing factor in the accumulation of lint within the dryer. Further information on the expected and foreseeable use of flexible foil transition ducts will be included later in this report.

Clothes Dryer Transition Duct

The 2 ½" metal vent hood was a roof style hood, although it had been installed on the exterior wall. The hood was constructed of heavy sheet metal and was equipped with a backdraft damper that was in proper working order. The hood was not equipped with any screen or guard. The hood had only trace amounts of lint inside. Since the section of pipe that had been attached to the hood that passed through the wall was not collected it could not be examined. However, based upon the type of vent hood this would have been a rigid metal round duct pipe approximately 6"-12" long and, given the minimal lint accumulation in the available venting, likely would have had trace to minor quantities of lint inside of it. Based upon the venting, the dryer was installed in a reasonable and foreseeable manner, using common and appropriate vent materials. Also, the total interior condition of the venting revealed that the dryer's vent system was not obstructed or otherwise configured in a manner that would reduce airflow and that it was cleaned on a period basis. This was also consistent with Mr. Vitale's testimony that he cleaned the dryer venting yearly.

Exterior Vent Hood

Conclusion from Subject Dryer Examination

Based upon this evidence examination, it was determined that the fire originated within this Electrolux gas-fired dryer. No causes could be identified relating to any electrical or mechanical failures of the internal components. The dryer was running at the time of the fire; this eliminated any fire causes related to contamination of the drum load. The lint screen was removed from the lint trap at the front of the drum after in the early stages of the fire. The accumulation of lint behind the drum was the first fuel and was ignited by the gas burner during operation. The burning lint that was ignited behind the drum ignited the lint that collected in the trap duct which, in turn, ignited the plastic lint trap, trap duct and blower housing allowing fire to communicate to the exterior of the appliance. The accumulation of lint that was the first fuel ignited, and also served as secondary fuels, accumulated behind the drum where it had the highest risk of being ignited due to the defective design of the Electrolux Ball-Hitch dryer, as will be discussed in detail throughout the remained of this report. Additionally, the defective design of the dryer in its inability to contain the fire will also be discussed in detail later in this report. Although in this

specific case, the dryer door was left open during fire discovery, the substantial cause of fire escaping containment of the cabinet was the large quantity of internal plastic components that served as the fuels which compromised the gas valve of the burner assembly, allowing for the unregulated release of natural gas during the fire.

Electrolux Documents Reviewed:

General Discussion of Documents Produced

Electrolux has produced hundreds of thousands of discovery documents in litigation in this and other cases. The Wright Group has been involved in hundreds of dryer fire claims involving Electrolux Ball-Hitch dryers, has been deposed by Electrolux dozens of times and has testified in court for Plaintiffs against Electrolux on multiple occasions. While the entire volume of documents cannot be summarized in this report due to the massive amount of information produced and timelines associated with the production of this report in compliance with court scheduling, as well as protective orders that do not allow us to discuss all of the information we have reviewed in many other cases, some of the relevant information can and will be discussed below. However, we reserve the right to amend and supplement our opinions at a later date using the information contained within the discovery documents.

Review of Depositions of Carl King and Fredrick Pauk:

Both Carl King and Fred Pauk, former Product Safety Engineers employed by Electrolux in their Laundry Products Division, were deposed in the numerous Electrolux Ball-Hitch dryer fire litigation cases over the past 15 years. Review of these depositions revealed that the role of these employees was primarily to interact with the voluntary standards agencies that Electrolux dryers were listed and labeled under, including UL and ANSI. Their secondary role was to provide litigation support to the legal department for fire and other claims.

It is important to note from all of their depositions that neither Mr. King nor Mr. Pauk have any specific training, education or experience in the field of "Safety Engineering", meaning the engineering discipline that involves conducting Failure Modes and Effects Analysis and employing engineering principles to assess and reduce the risk of harm for consumer products. Electrolux has no internal company standards or policies regarding product safety.

Based upon the deposition testimony of Mr. King and Mr. Pauk, it is evident that Electrolux was aware of the number of dryer fires they were experiencing in clothes dryers that were caused or alleged to have been caused by an excessive accumulation of lint within the dryer cabinet, particularly behind the drum in the heater area. Both Mr. King and Mr. Pauk testified as to the hundreds (if not thousands) of dryer fire claims investigations they have been involved with. Mr. King alone has been deposed in approximately 80 litigation cases involving alleged defects in Electrolux's laundry products, the most of which were dryer fires. These "Product Safety Engineers" have had no interactions with design engineers, managers or other Electrolux personnel to review safety concerns, including dryer fires, or to improve the safety of their products.

In his deposition in the Vitale case, Mr. King testified about several relevant topics, which are summarized below:

- He has not seen any records maintained by Electrolux that indicate the number of fires or failures statistics on the Mansfield dryer or Freestanding dryer. He has never seen anyone at Electrolux do a statistical analysis of the fire failure rates regarding the Alliance platform. They have investigated every claim that was made on the Alliance dryers, but he does not know that anyone has performed any statistical analysis. If such analysis was performed, he would expect to have known about it.
- In 2009 or 2010, Electrolux added an additional label to the back for their dryers concerning exhausting. It was a label that restated what was on the customer checklist and instructed not to use foil or plastic venting with the dryer. Even though that instruction was in the manual supplied with the dryer, Electrolux added the label to the back of the dryer. He did not know exactly why it was a repetition of a prior warning that

was added directly on the product but it was probably based on a claims investigation. He was part of the conversation that involved adding the additional label to the back of the dryer. This conversation would have been in conjunction with his direct boss, the director of engineering, and some of their in-house counsel. His boss at the time was John Jergens. They did not perform or review any studies to make the determination that the repetition of that particular instruction or warning was necessary. They did not do any type of human factors studies; it was just added. They did not do any type of study or survey to find out if the addition of that label would cause the installer or consumer to change their behaviors. He does not recall the person who first came up with the idea to add the new instruction label to the rear of the dryer. He does not know who came up with the wording for that particular label; there were several drafts that were updated by the engineering group and counsel. The warnings or instructions that were added to the back of the dryer were not required by Underwriters Laboratories (UL). UL does require warnings and instructions to be affixed to dryers at the time of sale. Not all of the warning labels on Electrolux dryers were mandated by UL or the American National Standards Institute (ANSI). The label added to the rear of the dryer about not using vinyl or foil exhausts was the only label that he could recall that wasn't fully required by UL or ANSI, but the other labels had some verbiage beyond which was required by those organizations.

- When they switched from the Freestanding platform to the Alliance platform, they compared the designs based upon their life testing. The Alliance performed equal to or better than the Freestanding platform in their life test. After Alliance launched, they reviewed warranty history and calls to make certain the design changes did not adversely affect the dryer. They continually evaluated the Alliance dryer to the Freestanding dryer to make certain it was as good as or better than its predecessor. Not only did they investigate warranty data but they also investigated any claims related to both platforms. There was no expressed mention of fire safety during any of their comparisons. They only looked at overall performance and lint accumulation. They conducted testing to see if the dryers were reliable, to ascertain if it was prone to any specific type of mechanical problem that would result in warranty calls and if it would survive 5000 test cycles without any kind of major safety concerns. 5000 cycles is the approximate useful life of

the appliance, which equates to 10 to 12 years. He does not recall any independent analysis of the number of fire claims coming from the field to determine whether the overall performance of the Alliance dryer was as expected. They didn't survey any people in the field; they only monitored warranty and claims data.

- Part of his deposition notice indicated to him that he would be expected to testify how Electrolux's dryer designs address hazards associated with internal dryer fires between 1988 and 2012. He agreed that internal fires are a hazard that Electrolux would have addressed in its design engineering. They had performed Failure Modes and Effects Analysis (FMEA) where fire hazards were discussed. Internal fires are rated as a high hazard in pre-production FMEA of design criteria. He is aware that fires are a very major hazard and a very common experience with clothes dryers. He bases this upon his own claims investigations which include at least 600 clothes dryer fires over 7 years. He has also seen spreadsheets where the fire claims involving Electrolux dryers were in excess of 1000 fire claims.
- He could not say how common lint fires were in the Bulkhead dryer design because he has not seen all the documents and information available to Electrolux. He has only personally been involved in two instances where a Bulkhead Electrolux dryer was involved in some kind of fire. He was not privileged enough to obtain details to make a determination whether the fire was specifically caused by the ignition of lint. His only involvement was identifying the product as an Electrolux Bulkhead dryer.
- He is not aware of any other statistical studies performed by Electrolux from 1988 to 2007 where they compared fire incident rates between their dryers and other manufacturers. In regards to his testimony that internal lint ignition fires are common to all dryer design platforms, he is referring to every platform manufactured by Electrolux prior to 2011 including Alliance, Next Level and Affinity. He has seen or investigated claims on all of those platforms, and Laundry Centers, both in gas and electric models. Electrolux has no data to support an assertion that lint ignition fires are common to a Bulkhead design of dryer. He is aware of only two fires in a bulkhead dryer. He does not know what caused those fires. He has also never seen any data on Bulkhead dryers manufactured by Electrolux's competitors from 1988 to 2011. Therefore, he could not compare any Electrolux claims versus those other manufacturers.

- Even though he has testified in dozens of cases and has been designated as Electrolux's corporate designee, he has never asked Electrolux whether the Bulkhead design that it built has experienced internal lint ignition fires similar to what he has seen in the Ball-Hitch design built by Electrolux. Even though he has heard of the criticisms of the Ball-Hitch design compared to the Bulkhead design, he is not curious if the claims department has any lesser instances of fires in the Bulkhead design than the Ball-Hitch design. He could not explain or describe potential reasons why fires may be more likely in Ball-Hitch dryers than Bulkhead dryers because he does not know if they are or are not more likely in one design versus the other.
- Electrolux discontinued production of the Ball-Hitch dryers in 2011. They began production of the Bulkhead dryers in 2008. The only Ball-Hitch dryers that Electrolux manufacturers today are the Laundry Center units. The Laundry Centers must also comply with the current UL2158 standards. There were five or six things that they had to change in the Ball-Hitch Laundry Centers so that they would comply with the minimum voluntary standards. They had to change the material that the blower housing was being molded out of, add a shield underneath the dryer drum on top of the console, change the material that the door gasket was molded out of and add some sealant around some of the larger gaps. These changes increased the production cost of the Laundry Centers. Electrolux performed cost analysis to evaluate the increased cost over the prior version of the Laundry Center that did not need these changes. Mr. King could not recall the numbers but he estimated it was a 1-2% change in cost. He does not know if that cost difference was passed along to consumers in the form of pricing. They began discussing the design changes necessary for the Laundry Center to meet the UL requirement in 2009 or 2010, because that's when those standards were released. During their design changes and testing, the Ball-Hitch Laundry Center required fewer modifications and passed the fire containment test faster than the Bulkhead design did.
- In 2013 there were changes to UL 2158, the electric clothes dryer standard that required the dryer to have different features and fire safety capabilities. There was an additional test the dryers needed to pass. They never tested the Ball-Hitch dryers to that standard because production was ceased on that design prior to the standard requirements coming into effect. The changes to the UL 2158 standard were developed over time. There was

a draft submitted to AHAM, which discussed with all of the dryer manufacturers in the industry. Mr. King was involved in these AHAM calls and passed along the information with his boss and the design engineers. He does not know if Electrolux considers itself a thought leader in the terms of consumer appliance design, but Electrolux does consider itself a world-class manufacturer. He could not answer why a world-class manufacturer would wait for voluntary standards testing to change prior to designing an appliance that can contain a fire, which identified as being the number one most dangerous hazard affecting the product's use. He was not involved in any conversations where they discussed the possibility of changing the design prior to the standards change.

- Mr. King was familiar with the GE SEE test that they performed in the early 1990s on dryers manufactured for GE by Electrolux. GE required that a fire containment test be performed and that a drum fire would be contained within the cabinet. Based on the testing that they performed on the GE models it was more likely that the GE models, with their changes, would contain a dryer fire that started in the drum than the others Electrolux manufactured which did not contain drum fires. The GE dryers had a different front air duct that was molded out of a different plastic material. The GE dryers also were equipped with a belt switch but he does not know if that had any relation to passing the drum fire containment test.
- Electrolux participated in the development of the fire containment testing standards by taking part in the AHAM calls with all of the other manufacturers from the time the proposal was drafted until it was implemented. He did not keep any records or diaries of the AHAM calls. There are some documents from AHAM with an email list that indicated everyone who was taking part in the calls. Initial proposals and discussion of fire containment testing went as far back as the 1990s. AHAM copied Electrolux personnel on emails regarding those discussions back then.
- Mr. King understood that the UL test proposals would include full containment of a fire when he was involved in discussions in 2006. He passed this information on to his supervisor, John Jergens, and the Design Engineers. He does not know if there was any effort expended by Electrolux between 2002 when AHAM recommended revising the UL 2158 Standard to include fire testing until the time of his own involvement in 2006, to

review or revise Electrolux's designs in preparation for the upcoming fire containment requirements. There are no Electrolux fire containment testing documents from 2002 to 2006. Electrolux never performed any fire containment testing using any fire containment protocols before they were published in the Standard in 2009. The only fire containment testing they performed between 1999 and 2009 was the GE SEE test. He is not aware that Electrolux tested any fire containment prior to the date of the UL standard being published in 2009. He has not asked anyone whether such testing documentation exists or if any such test was conducted.

- Mr. King stated that lint doesn't cause a fire. Lint is a fuel for a fire after its ignited. He has never seen anyone define the exact ignition scenario or first thing ignited in a dryer. Electrolux understands that lint presents hazard because it is a fuel in the dryer. However, what causes the ignition is not known. Even though no one at Electrolux has ever exactly determined the ignition sequence of what first ignites and where, lint creates a fuel that is a fire hazard in a dryer. Restricted air flow creates more lint in a dryer, which creates more fuel. Mr. King could not explain how a fuel combines with a heat source in an Electrolux dryer to cause a fire. They have never determined the exact ignition sequence. The heat source is more likely to ignite lint than anything else, but exactly what ignites and when has not been determined that he has ever seen. The gas burner and the electric coil heating element are both hot enough to ignite lint. There are also electrical components that, if they were to arc, they arc would be sufficient to ignite lint.
- The only discussions about fire containment testing that Mr. King was aware of occurred between him and his boss, John Jergens, sometime after Mr. King was involved in the process after 2006. He would have had an oral conversation with Mr. Jergens during one of his weekly or frequent updates. He does not know if Mr. Jergens had any information about the overall frequency of fires versus their production numbers. He was aware Mr. King was investigating claims, because he was signing his travel requests and time sheets. Mr. King also discussed the results of some of his finding with Mr. Jergens. Mr. Jergens was responsible for overseeing the design engineers at this point in time. Mr. King did not recall having any written communications with Mr. Jergens. Mr. King was not required to write any reports of his finding from his field investigations. He never

asked the company how he was expected to report his findings from his field investigations. Mr. King was the person from Electrolux that would talk to the Director of Engineering and report the results of the field investigations to him. Mr. King is not a licensed professional engineer. He has a degree in civil engineering. He is not an electrical engineer or a mechanical engineer. Mr. King was the only person who reported to the director of engineering for the Electrolux laundry division to report information that he was told by other experts during their investigations to the Director to pass along to his Design Engineers. There were no written records or reports passed between the experts, Mr. King, Mr. Jergens or the Design Engineers. Mr. Jergens never asked for a written report of his findings. None of the forensic consultants reported to Mr. Jergens. Mr. King does not recall Mr. Jergens ever reviewing the outside experts' reports. The only person who reported the field investigation findings to the Director of Engineering was Mr. King, and before him, Mr. Pauk. He does not know who reported to the Director of Engineering in the time period where there was no Product Safety Engineer between Mr. Pauk and Mr. King. Mr. King has done nothing to investigate what Electrolux was doing to communicate field performance data or investigations to their Design Engineers during the time that they were producing dryers that were alleged to be defective in their design.

- As Electrolux's designee, he is the person selected to testify about Electrolux dryer fires and the hazards that are presented by the use of Electrolux Ball-Hitch dryers. For Electrolux to understand the hazards they have to identify the cause of those hazards first. This would be part of the claims investigation process but would also happen well before any claims could occur during the design phase FMEA process. The FMEA portion of the design process is where the design engineer looks at every aspect of the dryer to assess the likelihood of a failure and what the outcome of the failure would be. The FMEA was performed as part of the design phase, before a dryer was ever sold to a consumer. They conducted FMEAs on all dryer designs between 1988 and 2011. From 1988 to 2003 Electrolux used FMEAs to identify hazards and determine the causes and effects. These discuss all of the ways that a dryer could fail and what the outcomes of those failures would be. They used this information to address those possible failures in the design. One of the hazards identified through the FMEA was an internal lint fire. Mr.

King has never seen ignition of lint by the dryer's heat source identified as a failure mode in an FMEA for any Electrolux dryer, regardless of the design or platform. Mr. King repeated that lint ignition is a known hazard in a dryer but he does not recall seeing it written on an FMEA or FMECA.

- Lint is a naturally occurring part of the laundering process and cannot be eliminated from the design. It is not necessary to eliminate lint from the design to eliminate the hazard of flames escaping the dryer cabinet after lint ignition occurs. However, reduction of lint would significantly reduce the spread of fires. Lint is not necessary because there are other potential fuel sources in the dryer that could be potentially ignited and cause fire to escape the cabinet. He didn't know if there was anything that Electrolux could have done to eliminate lint from accumulating in an area where it was likely to become ignited. He thinks that if the Installation Instructions are followed, lint will not accumulate in significant quantities in hazardous areas. This is evidenced in their reliability testing and their comparative testing they did in 2009. There was nothing in their reliability testing that shows that lint cannot become ignited during the operation of a dryer that is properly used, installed and maintained. Their reliability testing shows that lint does not accumulate in those areas in significant quantities to sustain a flame. It does not, however, eliminate the hazard. If lint is in the dryer, it could potentially become ignited. Lint collects in every dryer from the first time it's used. Electrolux has known this since before 1988.
- During a prior deposition with Plaintiff's attorney he had reviewed FMEAs that identified flames escaping the dryer as a failure mode and hazard. Mr. King stated that the FMEAs addressed that as a possible hazard in the design reduced or eliminated the hazards as much as a design could. Electrolux investigated every claim brought to it for potential design issues. Prior to the production of the Alliance platform, Electrolux identified flames escaping the dryer as a hazard common in the use of its Freestanding dryer. He does not know if Electrolux had any data to suggest that flames escaping the cabinet were a particular hazard inherent in the use of its dryers prior to the production of the Freestanding dryer. He has never been involved in the investigation of a dryer fire involving a dryer produced prior to the Freestanding dryer. He has only seen a couple dryers from the Freestanding platform during claims investigations. Based upon his

claims investigations, he knows that once a fire starts in the dryer cabinet, a percentage of them will escape the cabinet. He does not have any statistics that indicate what percentage of fires escape the cabinet. He does not know if it is a high percentage or low percentage. In almost all of the claims investigation there is some damage to the home in every event; sometimes it's just smoke and other times it's just localized heating. The effects of fire escaping the cabinet include injury or death to the consumer and possible ignition of nearby items that could spread fire to the entire house. In a fire he investigated in which the 10 year old child died, flames did escape the dryer cabinet because the entire structure was damaged.

- As a result of Electrolux's dryer fire claims investigations, there was nothing ever determined that a design change would have changed the outcome. Mr. King discussed the findings of the claims investigations with Mr. Jergens, the Director of Engineering. These discussions were verbal only. He did not recall the specific conversations he had with Mr. Jergens. He would generally report the observations, including restricted air flow, and would report that no product fault or failure could have caused the fire in instances where they could not find a component failure that would have led to the ignition. He does not recall ever discussing with Mr. Jergens the possibility that there could be a better way to design Electrolux dryers in a manner that allows them to contain the fires, regardless of what caused the fires. He does not know if John Jergens was aware of the recommendation that was made to UL in 2002 about updating the clothes dryer standard to require fire containment testing. Throughout his tenure as Safety Engineer, Mr. King never inquired of Mr. Jergens what the company was doing to develop products that were capable of containing fires. Mr. King does not know why Electrolux didn't design a dryer capable of containing fire prior to the updated requirements published in the UL Standard in 2009. He was never involved in any conversations as to when they would start testing or start the design change. This decision would have been made by management, probable Mr. Jergens and his superiors. He does not know if those individuals ever discussed it prior to 2009.
- Electrolux has never done any formal analysis as to the failure rates between platforms. However, he would have noticed an abnormally high incident rate in one platform when compared to another during his claims investigations. He investigated more claims

involving Alliance dryers, but he expected this given the time period he was examining those dryer claims in. The pre-Alliance Freestanding dryers were mostly out of use because they had reached their end of life. In respect to Electrolux Bulkhead dryer fires, he is not privileged to all of the claims data right now. He is aware of two claims or instances where he was asked to identify the fire, but that is all he knows about Electrolux Bulkhead dryer fire claims. He did not investigate the causes of those fires. He does not know anything about the origin and cause of those fires. He has not asked Electrolux any questions as to the failure rate of Bulkhead dryers built from 2008 to present.

- In response to testing performed in response to dryer fires reported to have occurred in Japan and all communication regarding such testing, he had reviewed a dozen of the copies of the PowerPoint that Mr. Ripley prepared between himself, JGA and METI. He also read some of Mr. Ripley's information in the PowerPoints that talked about the addition of an automatic resettable third thermostat which would trip in extreme blockage situations and alert the consumer that there was something wrong that needed to be investigated. This would create a situation where the user would not be able to use the dryer and have to investigate the cause if this condition occurred. Mr. Ripley recommended this design change to Electrolux and to the Japanese government. He explained this wouldn't simply become an annoyance but would make it impossible to operate the dryer in a manner that would cause lint to accumulate in a dangerous fashion. The proposed design change in the feasibility report would, under very abusive situations, turn the dryer off and lead the homeowner to probably investigating why the dryer shut off mid-cycle. Mr. Ripley also made additional recommendations in 2008 to 2009 in an attempt to redesign the dryers so that Electrolux could once again sell them in Japan.
- The 18 month cleaning that Electrolux uses in their manuals most frequently was developed from the standards requirement that the warning contained the word "periodic"; Electrolux defined 18 months rather than periodic. This was done in the 1970s by senior design and testing people who had experience with the clothes dryers. The UL 2158 Standard only states that the dryer should be cleaned "periodically". They don't define "periodically", which is a subjective term. Because it is subjective, Electrolux defined it as 18 months.

- He has never seen any step-by-step instructions about what needs to be done to perform the cleaning every 18 months. The dryer needs to be partially disassembled and cleaned. Cleaning the interior of the dryer every 18 months is not going to prevent a fire. It does remove the lint, which is a fuel source. There will always be a potential for ignition in the dryer; it only takes away the lint. If there was no lint, the first fuel in the dryer could be clothing. It would depend on the fire scenario and exactly how and where the fire starts. The clothing load is not likely to catch fire based on restricted venting. The clothes load would most likely be the first material ignited if there was arcing or spontaneous combustion to ignite the drum contents.
- He does not recall seeing more than one reference to lint becoming ignited in the heater pan during Electrolux's reliability testing. He recalled only one instance where there was an observation of charred or discolored lint, but he does not remember ignited lint or fire in the pan.
- They do not disassemble their dryers at the equivalent of 18 months in their reliability lab. The dryer with the discolored or charred lint was disassembled after 5,000 cycles. He was uncertain how they could determine if there was burned lint in the heater pan within 18 months in a properly installed and vented dryer when they do not disassemble them until after 5,000 cycles. The only other possible reference would be in the warranty data. When reminded about the CUFT data, he did admit that the person who wrote the report referred to charred lint. This is document EHP SF 0263496, a study of some CUFT dryers in the field authored by Mr. Peter Patrew. This is the only document that he can recall that refers to charred or burned lint being found in an Electrolux dryer that was operated for less than 18 months and was properly installed and vented. He does not know how the lint became charred or burned. It is possible that it was only discolored based upon heat exposure.

Recently in the Cloud case, the depositions of Mr. King and Mr. Pauk discuss the fact that Electrolux dryers were banned for sale in Japan after the country experienced a high rate of fire occurrences in these Ball-Hitch gas dryers given the relatively small population distributed in Japan. It is obvious from the studies commissioned by the Japanese government that the first fuel ignited in these dryers was lint collected in excessive quantities within the lower portion of

the heater pan. The findings of the Japanese study were not disputed by testing, reports or presentations from Electrolux's own Design Engineer, Brian Ripley. Mr. Ripley agreed that the excessive lint accumulations were occurring within the heater pans, though it was his opinion that this was partly caused by improper installation and a problem with the fan motors running at a slower speed in Japan because of their electrical supply running at a different frequency as expected. To reduce the risk of lint accumulation in these dryers due to reduced airflow, Mr. Ripley offered multiple design changes to the Ball-Hitch dryers that Electrolux hoped would appease the Japanese government and allow Electrolux to re-open the sale of dryers in Japan. These design changes proposed by Electrolux would force users to have their dryers serviced if they were operated under reduced airflow conditions that cause the excessive accumulation of lint within the dryer. Mr. King could offer no reason why some of the design changes offered to reduce the risk of fires in the Electrolux dryers distributed in Japan were not proposed or employed in any of the much larger volume of dryers sold in the United States. It is clear from Mr. King's depositions that Electrolux ignored the risk to consumers and failed to research, test or implement any changes to the design of these dryers or their literature that would have reduced the risk of fire.

Mavruk/Charter Oak v Electrolux Decision

We have reviewed a memorandum and order dated July 30, 2012. This memorandum and order has been signed by United States District Judge, Joseph F. Bianco in the Mavruk/Charter Oak Insurance v. Electrolux case in New York. The Court's memorandum makes reference to Electrolux documents which indicated the following:

1. That the warranty information for all freestanding Frigidaire and Kenmore gas dryers from 2002 to 2007 revealed 2,341 warranty claims referencing fire or the indicators of one.
   1a. That of the 2,341 warranty files, 80% of the claims involving a fire or an incident with burning, melting or smoking that were tied to lint occurred at 18 months or less.
2. There have been over 8000 pages of emails and attachments, which included an investigation performed by Electrolux of warranty information covering fires in gas dryers from 2002 to 2005.Electrolux has a dryer fire census revealing 1,800 dryer fires.

3. Electrolux has Consumer Product Safety Commission reports in Electrolux files regarding dryer fires.
4. Documentation from Electrolux revealing that Electrolux discovered charred lint in a heater pan in its test dryers as early as 1995.
5. Documents from a 2005 Japanese government investigation, in which it's Design Engineer, Mr. Brian Ripley, admitted that lint could travel out of the back of the drum and into the heater pan.
6. Service Bulletins and training manuals, which provide pertinent information on dryer design.
7. Brian Ripley, from Electrolux, testified at his deposition on June 22, 2011, that he had seen a report as early as 1995 that indicated, "Also the lint in the heater pans "especially the gas" is charred showing that it could be ignited in the burner tube and carried up the tube in the heater pan."
8. Mike Rickleffs, an Electrolux Engineer testified at his deposition on June 23, 2011 that, "He performed a test in 2002-2003, which proved that lint could ignite in the burner tube, and ultimately ignite the load."

Harotounyan/State Farm v. Electrolux & Sears

In a non-confidential deposition taken in the State Farm v. Electrolux & Sears case[15], Brian Ripley of Electrolux was deposed. Mr. Ripley was the lead Design Engineer for the subject Electrolux Ball-Hitch clothes dryer platform. The following information was learned from Mr. Ripley's deposition.

- He admits that he did testing in 1996 on Electrolux ball-hitch dryers and that the dryers did not pass the GE fire containment test.
- He stated there were several additional fire containment tests that were performed in the late 1990's. They were all drum fire tests.
- He was asked if the plastic used in the trap duct and blower housing is combustible plastic. He answered yes. He was then asked could Electrolux have used a metal blower housing for its dryers that it manufactured using the ball hitch dryer design, but Electrolux chose not to, is that correct? He answered they could have chosen metal versus plastic.
- He was asked Electrolux could have made all internal components of its dryer that were underneath the dryer drum and inside the dryer cabinet of metal and the dryer would function and operate the same as the plastic components, correct? He answered Electrolux could. He was also asked, Electrolux could have used all metal

[15] State Farm General Insurance Company vs. Electrolux Home Products, Inc., Sears Roebuck and Co., and Does 1-25, Superior Court of the State of California, County of Los Angeles, North Central District, Case No. EC053578

parts but they chose not to, correct? He answered correct? He was also asked that Electrolux knew that it could manufacture and sell to U.S. customer's ball hitch design dryers that incorporate strictly metal parts internal to the dryer cabinet, correct? He answered the knowledge was that we knew that we had competitor that were using steel. Additionally he was asked, was there, to your knowledge any economics that ever played into the decision to use plastics versus metal internal components of a ball hitch dryer design? He answered no.

- He was asked did you ever perform, yourself, any testing for the potential for combustible lint to accumulate within the ball hitch dryer? He was asked when did you perform this testing? He answered I don't recall the last - - or when we had conducted lint accumulation. I know we did a test to compare all of our dryers to competitor's dryers on the market. Question – to compare them in what regard? Answer - to compare them in the lint accumulation or where lint would accumulate in the dryers. Question – when was this test performed? Answer – he answered sometime in 2008. Question – did you participate in all this testing? Answer – yes. Question – nevertheless, this was Electrolux employees that were performing this test? Answer – yes.
- He was asked did you ever have any conversations with Mike Rickleffs about controlling lint accumulation in lint fires within ball hitch dryers that Electrolux manufactured? He answered yes.
- He was asked did you do any lint ignition testing other than the testing you testified to relative to the electric heating element testing, he answered yes. Question – what other tests did you perform? Answer – we were trying to see the effects of lint being drawn into the burner tube. Question – describe for me how you got the lint near the burner tube? Answer – with the drum not installed, we placed lint down into the heat duct and then put the drum back into position, reassembled it, loaded it with dry towels and started it. Question – and when you started it did you observe the lint ignite, blow into the heater pan and ignite the dryer drum, correct? Answer – yes. Question – and did that lint start the towels on fire that were in the drum? Answer – yes. Question – did the fire also ignite the lint trap or any of the plastic components in the blower housing? Answer – we extinguished the flame after it ignited the towels. Question – he was asked did you report the findings of your testing to anyone at Electrolux? Answer – I don't recall. This testing was done in the late 2000's but he doesn't recall exactly when.
- He was asked if there were other tests completed to the Electrolux dryer as it related to accumulation of lint and potential fire hazards. He answered there are a lot of tests that go on that I'm not aware of. He was asked you know there has been testing that has been done on ball hitch dryers for the last 12 plus years, correct? He answered correct. He was asked you knew of the existence of the testing? He answered yes. Question – but you never bothered to find out the results of those tests? Answer – no.
- He was asked are you aware that Mr. Pauk (the prior Product Safety Engineer) had commissioned lint accumulating testing before 2003? Answer – I am aware he had conducted some testing. I don't know the protocol that he used or what the results were.
- He was asked did Electrolux ever manufacturer dryers for certain brands like GE and were there any specific components to these brands? He answered on GE they had a

baffle on the heater pan and they used a different material for the air duct. The GE air duct had more fire resistant materials. It had a higher UL rating for the plastic. Question – who made the decision at Electrolux as to what materials its component parts were going to be comprised of in relationship to the ball hitch clothes dryers. Answer – GE dedicated their own components and materials based on an internal burn test that was done in 1998. He participated in the internal burn test and the internal burn test allowed flames to exit out of the cabinet. GE required them to use materials with higher flame resistance so that no molten material would come out the cabinet.

- Question – with the GE test procedures, in your opinion as a Design Engineer for Electrolux, more stringent then Electrolux for its own brand of dryers under the Frigidaire name? Answer – as far as passing the flame containment test at that time, GE was more stringent than what we were doing. Question – why did Electrolux decide not to use the material that GE selected for its air duct? Answer – I don't know.
- Question – was there any testing that was performed on the new Electrolux bulkhead design, as it relates to lint accumulation? Answer – we did a comparison of the new Electrolux bulkhead dryer design and compared it to our competitors and the Webster City ball hitch design. Question – when was that done? Answer – sometime in 2008.
- Question – now you did testing where you put lint in close proximity to the burner flame and you actually got a fire inside the dryer, correct? Answer – yes.

Electrolux Warranty Database

Warranty data on Electrolux ball-hitch dryers manufactured in Webster City, Iowa primarily contains warranty repair information on all ball-hitch dryer models employing this base design, including dozens of models manufactured under various brand names including Frigidaire, Kenmore, GE, Gibson, Tappan, Kelvinator and White Westinghouse. The warranty data primarily covers only dryers under warranty, whether it is the original factory warranty of 1-2 years or a smaller percentage of extended factory warranties of up to 5 years. Based upon a cursory analysis of this warranty data, there have been hundreds of reports associated with lint fires in these ball-hitch dryers during their short warranty periods. This is evident in keywords like fire, sparks, embers, smoke, burning/burnt odor/smell, burned/burnt/charred/scorched lint, burned/melted plastic, etc.

Documents Supporting Electrolux's Awareness of Risk

Electrolux was aware of the risk of fire from lint accumulating in the heater pan and being ignited by the heating element or, in their gas dryers, being ignited in the burner tube and being carried into the heater pan. Yet Electrolux failed to make any additional changes to the design or add any safeguards to prevent this lint from coming into contact with the heat source. Electrolux's only concession was to amend warning language in the UL 2158 voluntary standards to require consumers to have the interior of the dryer cleaned every 18 months instead of just "periodically", which all others manufacturers used as the standard warning at the time the subject dryer was manufactured. As demonstrated by the list of insurance claims against Electrolux, CPSC investigative reports and the fires reported by consumers or by service technicians in dryers under the warranty period, Electrolux is aware of thousands of fires that have been alleged to be caused by lint ignition in the area of the heater pan and has chosen to take no action. Per Electrolux's own admissions, the reasoning behind the change of design to the Bulkhead style dryers being used by most manufactures in 2008 was the need for increased drum capacity to compete against other manufactures, and not for any safety benefits the Bulkhead design has in relation to that designs inability for lint to accumulate between the heat source and the rear of the drum.

Japanese Study on Electrolux Dryer Fires

Electrolux was also aware that reduced airflow through the dryer can result in lint collecting more quickly in the heater pans. In or around 2005, Electrolux was confronted by the Japanese government due to a high frequency of dryer fires in Electrolux manufactured clothes dryers sold and installed in Japan. In response, Electrolux launched an investigation as to the root cause of these fires so that they could address any issues in the design of their dryers to lift the restriction allowing them to sell their dryers in Japan. Several reports were issued in 2005 during their analysis and in response to the Japanese governmental agency's report. Included in these reports are statements that agree with the Wright Group's opinions that lint can accumulate in the heater pan behind the drum due to the design of the Electrolux's Ball-Hitch design. In their January 19, 2005 Dryer Analysis Update, Electrolux's engineers concluded under their Root Cause Analysis

that "Excessive exhaust system restriction will reduce the flow of air through the unit. With the reduction in air flow, lint will find other avenues to leave the drum other than the designed path through the air duct and lint screen. One of these avenues is out of the back of the drum and onto the heater pan." Further in this report, Electrolux's engineer also opined that lint adding an additional filter to the back wall of the drum would also not prevent lint accumulation in the heater pan because "Fine statically charged lint particles will travel through any and all gaps (exaggerated by reduced air flow as a result of poor installation)"

Although it was Electrolux's determination that the Japanese dryer fires were caused by a different natural gas blend that created higher heat release and a reduced 50Hz power supply that slowed airflow when compared to the US's 60Hz power supply, they still fell back on improper installation as a root cause of lint accumulation behind the drum, near the heat source. Yet, as will be discussed later in this report, Electrolux has been aware that most dryers will be vented improperly regardless of their Installation Instructions at least as far back as November of 2000, as indicated in their Service Bulletins and did not attempt to correct their Ball Hitch design of dryers to properly manage lint collection and separate it from the heat source in dryers that may be installed in a reasonable manner, such as those with flexible transition ducts.

Accumulation and Ignition of Lint in the Electrolux Dryer:

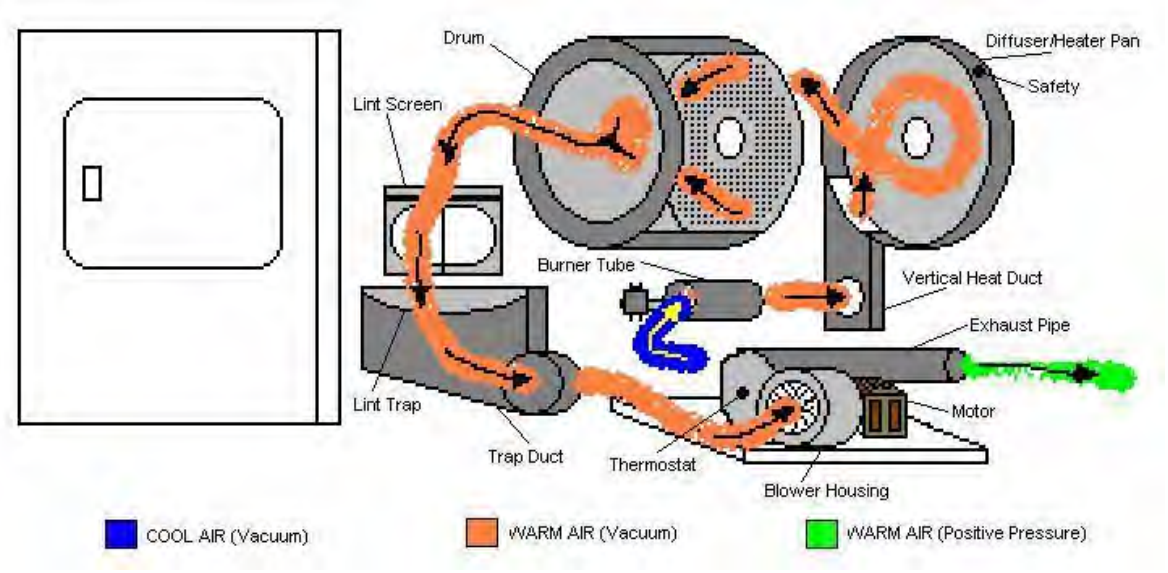
Generation and Adhesion of Lint

Clothing, towels, bedding and other products that are laundered are comprised of fabrics manufactured from a multitude of different materials including natural fibers, like cotton and wool, and synthetic fibers, such as polyester and nylon. Lint is made up of small portions of the fibers that are shed from these articles. The development of lint is an ongoing process that occurs over the lifetime of these fabrics. Movement of the woven materials results in breakdown of the fibers, releasing small portions of the fiber throughout the regular wearing or use of these articles and the laundering process. Beyond wearing, the washing process creates additional lint by compounding the breakdown of fabrics by minerals in the wash water, pH of the wash water, temperature of the wash water, chemicals in the detergents and/or liquid fabric softeners,

chlorine bleach or other oxygenators if they are used, and lastly with the agitating motions of the washing machine itself. The breakdown of materials continues in the dryer with the addition of heat and further agitation of the fabrics against the interior of the drum and between the articles themselves. The lint that is generated throughout the wearing, washing and drying process becomes airborne in the dryer. The purpose of the lint screen is to capture as much lint particulate as possible, but the lint screen never captures 100% of the lint that is released from the clothing while in the dryer. The remaining lint is either accumulated within the dryer cabinet or is exhausted from the cabinet through the exhaust tube and attached external vent.

Airflow in the Subject Electrolux Dryer

Below is a simplified schematic of the airflow and the major component locations to assist in understanding the origin and cause of the present event. Note that ambient air enters the dryer cabinet and through the use of vacuum is pulled through the combustion chamber/burner tube where it is heated, turns upward through the vertical heat duct and enters the heater housing/diffuser behind the drum. Air then enters the drum through the numerous holes located across the entire surface of the rear drum wall. The warm air then passes through the laundry load in the drum and flows through the lint trap, where the screen captures some of the airborne lint particles, through the trap duct attached to the front panel and into the blower housing. The air that has been pulled through the dryer components at this point is pushed by the fan through the exhaust duct and out of the appliance into the external vent attached to the rear of the appliance.



Airflow Diagram – Electrolux Ball-Hitch Gas Dryer

Lint Accumulation in Exemplar Electrolux 5.7/5.8 Cu. Ft. Dryers

Wright Group, Inc. has been conducting extensive research into dryer fires over the past ten years. As part of our testing and analysis, the Wright Group has examined dryers from all major manufacturers. While many of the burned dryers have been examined as part of their relation to the cause of the fire, a number of unburned units that had never been reported to be involved in fires have also been examined. The appliances are most often obtained in used condition, to observe the after effects of real world usage. Due to the recent influx of dryers manufactured by Electrolux, we have obtained numerous exemplar dryers, both burned and unburned, to familiarize ourselves with the components, operation, design and maintenance of these units. Our analyses into fire cause and fire containment, has also led to baseline testing and fire testing of these appliances. A summary of our observations and data is outlined here for review.

It should be noted that the exemplar dryers obtained by the Wright Group, with the exception of some brand new dryers we have performed testing on, come from real world conditions or are dryers that have been involved in a fire or have been obtained used, as to demonstrate real life conditions. We consider every active and non-active dryer fire case an exemplar and use information and physical evidence from those other cases to support our findings, as firm evidence of the real conditions to which they are subjected. With some of these exemplars we

have been able to document the exhaust system because the exhausts were collected as evidence. Others we have been able to obtain information about the exhaust from scene photographs or interview. Some dryers we have no understating of the operational history, installation or maintenance of the dryers. The same holds true with the majority of our unburned exemplar dryers, which we obtain through local retailers who remove used appliances when people purchase new ones. We rarely get a chance to remove appliances from a home environment, but rather receive them as recycled products. Others we obtain prior to them being reconditioned and re-introduced as used appliances. For those reasons it is impossible for us to document the information of how they were installed, how they were used and how they were maintained.

In examining the exemplar Electrolux dryers, we have noted that lint that is generated by washing and drying process is able to enter the space to the rear of the drum, regardless of the airflow traveling the opposite direction. The laundry in the drum contacts the perforated rear wall of the drum as it tumbles in the rotating drum. This results in stalled airflow, which allows the airborne lint particulate in the drum or any lint that is shed from the laundry contacting the rear perforations to penetrate through the rear of the drum. This happens constantly throughout the entire drying process.

Lint particulate also travels through the front of the drum into the components downstream, as outlined in the diagram above. The first and most obvious lint collection area is the lint filter screen at the lower front side of the drum opening in the front panel. This component is constructed of a plastic frame with a plastic, nylon or similar screen material. Downstream of the lint screen is the trap duct/blower housing assembly. All airflow within the dryer during operation is funneled through this choke point. The restriction, elbows and component materials cause a heavy accumulation of lint in this area. The trap duct is made of plastic and tapers to a restrictive elbow at the lower corner of the front panel. The adhesive used at the factory to glue the trap duct to the front panel remains tacky during its lifetime and any lint introduced will bond to the adhesive in the trap duct area. It is connected via a foam gasket to the blower assembly, which is also made from plastic and houses the fan impeller. If improperly installed, the foam gasket that forms the seal between the trap duct and blower housing can result in reduced airflow.

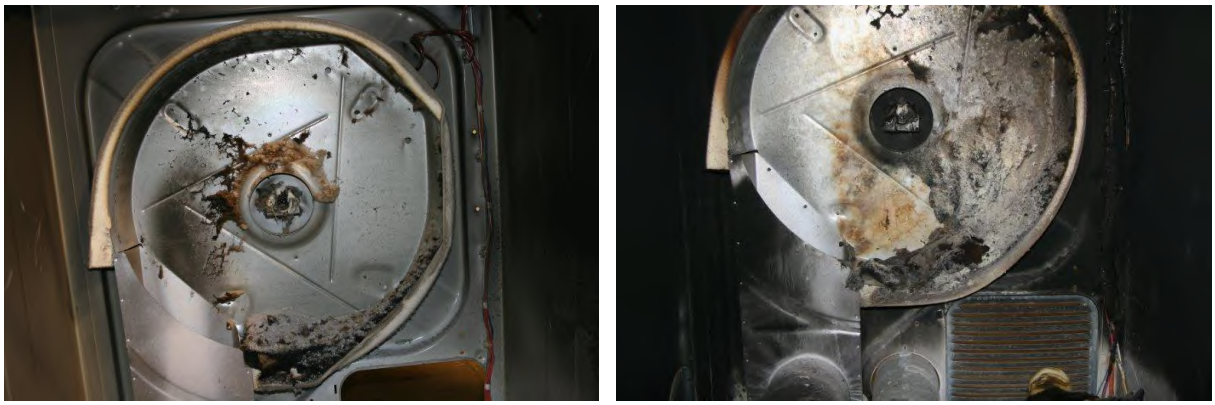
Photos of Lint Accumulations in Exemplar Burned and Unburned Dryers

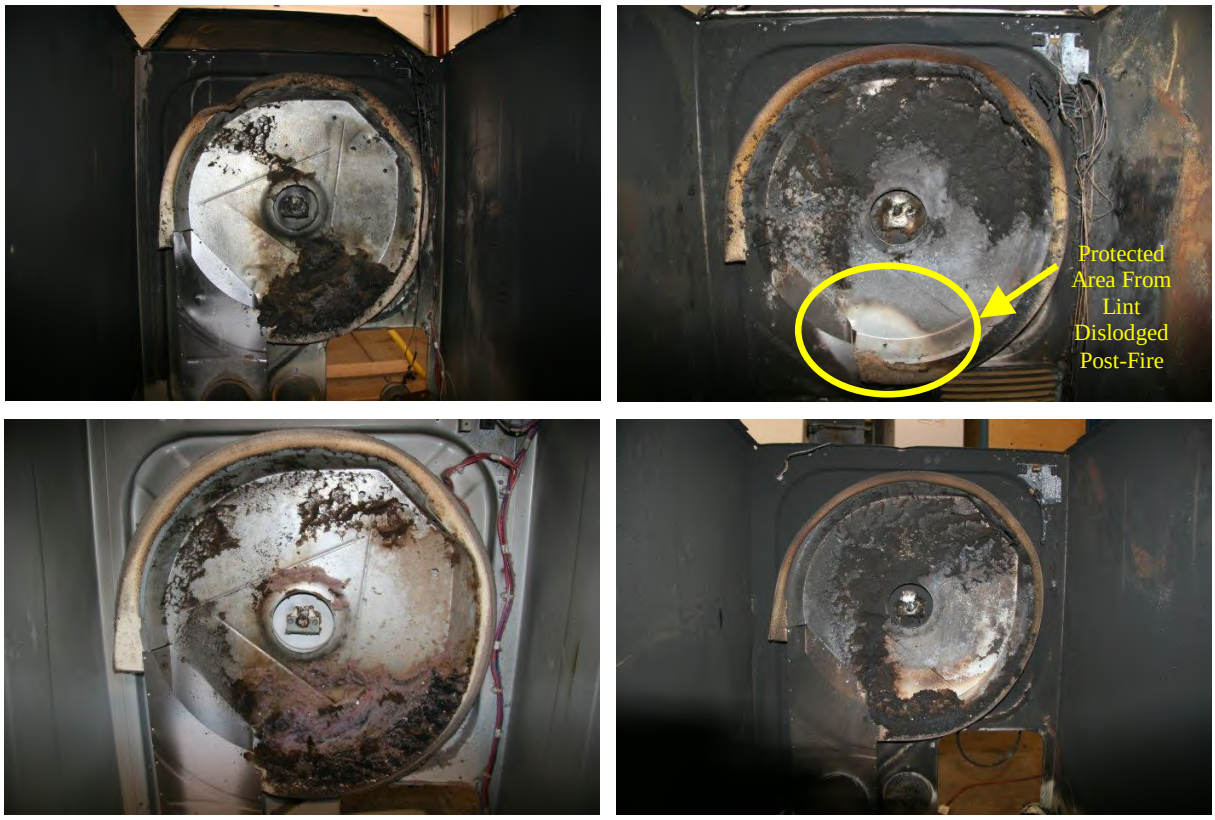
(At the Remains of the Trap Duct)

A significant quantity of lint collects within the heat diffuser (in gas dryers) or in the heater housing assembly (in electric dryers), which are located directly behind the drum. The gas dryer diffusers collect significantly more lint in this location than the electric, though both allow for lint to accumulate dangerously close to the heat source in either variation. Electric dryers have a deflector ring attached to the rear of the drum that collects lint and stores it against the rear of the drum, which is another significant lint collection location as it provides an opportunity for lint to detach from the rear of the drum and fall onto the heating element. In addition, this quantity of lint is an excellent source of secondary spread fuels that is in very close proximity to the heating element located directly behind the drum. The gas-fired dryers are equipped with a felt seal that surrounds the diffuser and forms a seal between the diffuser and the rear of the drum. The purpose of the seal in the gas dryer is to force the air to be drawn through the burner tube so the gas flame can heat the air as it is drawn into the diffuser and then is directed into the drum. Due

to this seal forming an enclosure between the diffuser and rear of the drum, there are no openings through which any lint can escape. For this reason it is common to see large quantities of lint accumulated in the lower portion of the heat diffuser, immediately adjacent to the vertical heat duct that carries the heated air from the gas burner in the base of the cabinet. Though there are differences in the mechanisms by which the lint collects in the area behind the drum between the gas and electric designs, both allow for collection of lint in close proximity to the heat source which provides a higher probability of a lint fire occurring than alternative designs used in the industry.

Photos of Lint Accumulations in an Exemplar Unburned Electric Dryer





Photos of Lint Accumulations in Exemplar Burned Gas Dryers

Lint also collects on the rear face of the drum. There are approximately 570 perforated holes on the rear wall of the drum that allow the air to be pulled from the heat diffuser to the rear into the laundry load within the drum. These holes are manufactured by punching through rear wall of the interior of the drum toward the rear. The result is smooth surfaces of each hole inside the drum, but a raised sharp surface on the rear wall of the drum, which further contributes to lint collection behind the drum. The shape and arrangement of these holes also allow lint to escape from the interior of the drum and collect on the rear of the drum and inhibit the lint from being pulled back into the drum.

In addition, all electrical models and some of the recent gas models have a heat shield or baffle installed on the rear of the drum. In electric dryers, this heat shield was used to protect the clothes from obtaining direct exposure to the heating element. This is not necessary in the gas models so we believe it may have been installed in recent models to change the airflow characteristics at the rear of the drum. With this heat shield or baffle installed on the rear of the

drum, an additional void space is created that allows for the additional collection of lint between the baffle and the rear face of the drum. In some ignition scenarios, particularly involving the electric dryers, this accumulated lint is the first fuel ignited. In cases where there is a significant quantity of lint accumulated on the rear of the drum, this lint also acts as a secondary fuel load that can assist in either spreading fire to the clothing inside the drum or lint accumulated further downstream in the trap duct.

Photos of Lint Accumulations at the Rear of the Drum (Gas & Electric Models)

Examinations of some of the used dryers manufactured by Electrolux, purchased strictly for use as exemplars to demonstrate internal lint accumulations, were found to have evidence of localized heating and/or charred lint behind the drum or small fires that were never discovered by the users. In addition, the burned dryers we have inspected as part of Origin & Cause investigations range from very minor damage to very major damage. These dryers have contributed to our understanding of lint accumulation, fire growth and development, fire containment and spread, potential ignition scenarios, etc.

In several minor dryers fires, damage was limited to the trap duct/blower housing and the lint that collected within this constricted assembly and was the result of lint ignited behind the drum being pulled into the lint trap and igniting the major accumulation of lint inside the trap duct. Numerous fire witnesses attest to only observing fire in the trap duct, not in the clothing load, before extinguishment of the fire. Since there is no ignition source in the trap duct, these fires can only occur from the ignition of lint near the heat source, located behind the drum, and the transmission of that burning lint to the trap duct and lint accumulated in that location.

As an example, in one particular Origin & Cause investigation we performed, the user was drying a comforter in the dryer. When the cycle finished the user removed the comforter from the dryer, but did not fold the comforter or examine it. Approximately 15 minutes later, the user was alerted by a sounding smoke detector and after searching first observed flames limited to the trap duct area of the Electrolux dryer. During our scene examination, the comforter removed from the dryer prior to discovery of the fire was examined and had charred holes in a couple of

places. This is clear evidence that the fire originated behind the drum in the heater housing from the ignition of lint that accumulated in that area. The burning lint was drawn into the load and into the trap duct, but only caused minor damage to the load before the user removed it from the drum after the cycle had finished. The delay in discovery was due to the smoldering fire in the trap duct that was not observed until after it had the opportunity to develop into a fire that ended up destroying the dryer and causing significant damage to the laundry closet, bathroom and hallway.

Electrolux's Contentions: Fires are caused by Misuse

Electrolux generally contends that its dryers are designed and manufactured in compliance with all applicable standards and, therefore, and fires that result in their dryers are caused by factors beyond their control. Electrolux categorizes only three causes of dryer fires involving their products: "improper installation", "misuse of the dryer" and "lack of maintenance". It is their contention that their product is properly designed and manufactured and any fires that occur once the unit leaves their control is not their fault. This is regardless if the fire was caused by the ignition of lint accumulated near the heat source or, in electric dryers, caused by an arcing event at the heating element caused by a failed drum bearing or foreign object escaping the drum and contacting the heating element. When confronted with lint ignition as the cause, Electrolux typically maintains that the accumulation of lint near the heat source is the fault of the user for failing to properly install or maintain the dryer. When confronted with fires caused by bearing failures, Electrolux typically maintains that the user is at fault for failing to recognize any potentially occurring abnormal squeaking or squealing as a precursor to a dangerous fire condition. And when confronted with a fire caused by a foreign object from the load contacting the heating element, Electrolux will argue that it was misuse that placed the foreign object in the drum; even though it is foreseeable the user may overlook a small item such as a bobby pin making its way into the laundry load. Electrolux further contends that none of these potential failures and hazards warrants any changes to the subject design of dryer.

Airflow: Restrictions and Leaks

Any restrictions or air leakage will affect the airflow within the dryer, and a change in the airflow will affect the efficiency of the lint particulate ejection. While exhaust restrictions are one of the factors commonly blamed for the collection of lint inside the dryer, it is not the restricted exhaust alone that is the sole factor on how much lint will accumulate in a dryer. The total amount of lint shed from the dryer loads is based on many other factors, including the type and condition of the clothing loads, the way and under what conditions in which they are washed, the period of time each dryer cycles last, the number of cycles the dryer is run, etc. Restrictions or air leakage causes increased drying times, one of the major reasons for lint to accumulate within the dryer. The increased drying times allows for more lint shedding from the clothing materials, as well as more lint generation for the tumbling action in the dryer drum. The longer the clothes tumble and chafe against each other or against the interior of the drum, the more lint is released into the dryer. Those same restrictions or air leakage then allow the extra lint that is released because of extended drying times to collect within the cabinet because of the reasons listed above, such as decreased air velocity, gaps in the drum seal, etc.

Minor restrictions or air leakage of any kind will affect the "vacuum" in the void space between the heat diffuser pan/heater housing and rear of the drum. This will allow for lint particulate to not be totally exhausted from the drum and accumulate instead behind the drum, as observed during the examination of exemplar dryers. This area to the rear of the drum is the most critical when referring to the potential for the ignition of lint, as it is where the heat sources for Electrolux dryers are located and the collection of a lightweight, easily ignitable first fuel collected near a competent heat source becomes inherently hazardous. Any type of minor restriction or air leakage will also affect the "vacuum" in the bottleneck and elbow formed where the trap duct (below the lint screen) mates to the front face of the blower fan housing. This fan is the transition point between negative pressure (or vacuum) and positive pressure (forced ventilation). The lint will accumulate in this area, as observed in the numerous examinations of exemplar dryers where lint was observed in the plastic trap duct.

Numerous factors can promote the adhesion of lint particles to the internal surfaces within the dryer cabinet. These factors generally include the smoothness of the surfaces of the components, the moisture content and/or density of the lint particles, condensation, gravity, static electricity, air leaks, bends, restrictions and blockages. This is not limited to dryers, but also would include any airborne particulate handling equipment, such as HVAC systems, etc. Any hypothesis that a restriction or blockage of the exhaust due to improper installation or maintenance being the sole cause of lint accumulation within the dryer places undue emphasis on a portion of the factors that lead to the accumulation of lint.

Reductions in airflow are created in several ways. One way to create an airflow reduction is to reduce the diameter of the exhaust vent to reduce output airflow. The addition of bends or increasing the length of the vent also reduces output airflow downstream of the blower fan. Reducing the amount of intake air will also reduce airflow throughout both the negative and positive pressure sides of the blower fan. Introducing foreign objects into the path of airflow will also reduce airflow on the whole. Lint accumulations in the dryer ventilation components and in the external exhaust ducting will reduce airflow and cause faster accumulation of lint within the cabinet of the dryer. But conversely, restrictions in the dryer itself are inherent to the design and vary depending on the load. A load that sheds a heavier quantity of lint based upon its size, material, etc., will restrict airflow through the lint screen, when compared to a load that does not generate as large a quantity of lint. Similarly, the introduction of a large laundry load into the drum (i.e. a comforter or other large items) also causes a restriction, and thus changes the airflow characteristics and efficiency of lint ejection. These are both restrictions that vary greatly from dryer to dryer, depending on the laundry applications each particular dryer is subjected to.

Air leakage is another major factor in the accumulation of lint within the dryer cabinet. The path of airflow is meant to carry the heated air into the tumbling laundry load and then exhaust the moisture laden air, and any lint that may not have been captured by the lint screen, into the exhaust ductwork and ultimately to the exterior of the structure. Any openings, gaps or improper seals allow air leakage that reduces airflow throughout the dryer, which contributes to the collection of lint behind the drum in the subject Electrolux dryers.

In the subject Electrolux dryers, key places where air leakage occurs includes:

1. The interface between the front of the drum and the front panel, sealed by a combination of plastic glides and felt gasket material.
2. The interface between the lint trap, trap duct and front panel.
3. The junction between the blower housing and trap duct, sealed by a piece of foam sandwiched between these two components.
4. The junction between the internal exhaust pipe and blower housing, sealed by a wide rubber band surrounding this interface.

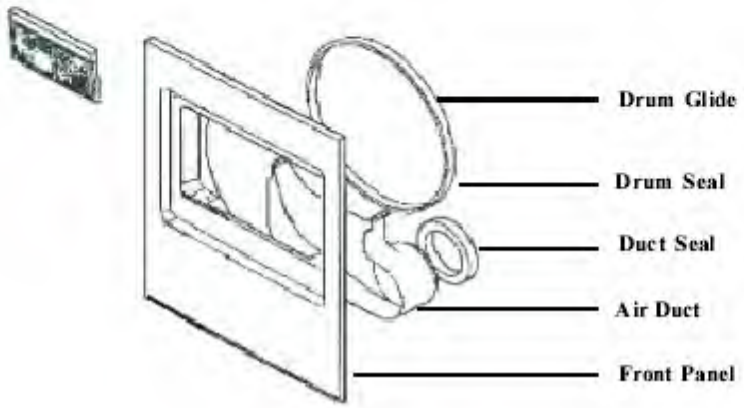
All of these interfaces are downstream of where the warm air enters the drum and the lint particulate is released from the clothing and becomes airborne. Electrolux has produced Technical Service Bulletins that demonstrate they are aware that air leakage has occurred over a number of years in the subject dryer design and uses those bulletins to attempt to correct problems they have with their dryer design.

Electrolux's Technical Service Bulletins: Reduced Airflow Causes

Electrolux has released a service bulletin in November 2000 (**Attached as Appendix II**) to educate the service providers in regards to ineffective drying and causes related to air leakage at various components of the Electrolux dryers. Below are excerpts from the service bulletin with highlighted areas of interest:

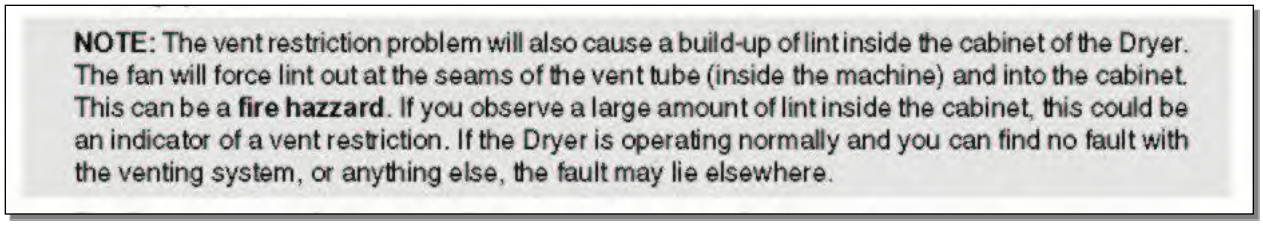
2. If it is an Electric Dryer, check to see that full power is available at the receptacle. The motor will run and the drum will tumble if supplied with 110 volts (or 108V or 120V), but the heater requires 220 volts (or 215V or 240V). If it is not heating, find out why. If it is a Gas Dryer, is the burner igniting? Once ignited, does it continue to burn or does it immediately shut down? With the door shut you can hear the burner ignite and then cycle off. Bear in mind that if the door is open it will cycle on the flame switch at a much faster rate than normal. The blower will pull air from the path of least resistance, namely the open door and not through the burner tube. This will cause heat to pool in the burner area instead of being drawn through the drum, which then causes the (bimetal) limit switch to open, thus cutting power to the coils in the valve and turning off the gas.

In either model, this "short-cycling" can also be caused by a defective seal on the door, an improper seal at the drum glide or drum seal, or the air duct seal between the fan cover located on the fan housing and the duct that is mounted on the front panel (see illustration), as well as a defective blower fan. The result is that the load will take longer to dry.



Electrolux Service Bulletin – November 2000, Page 16

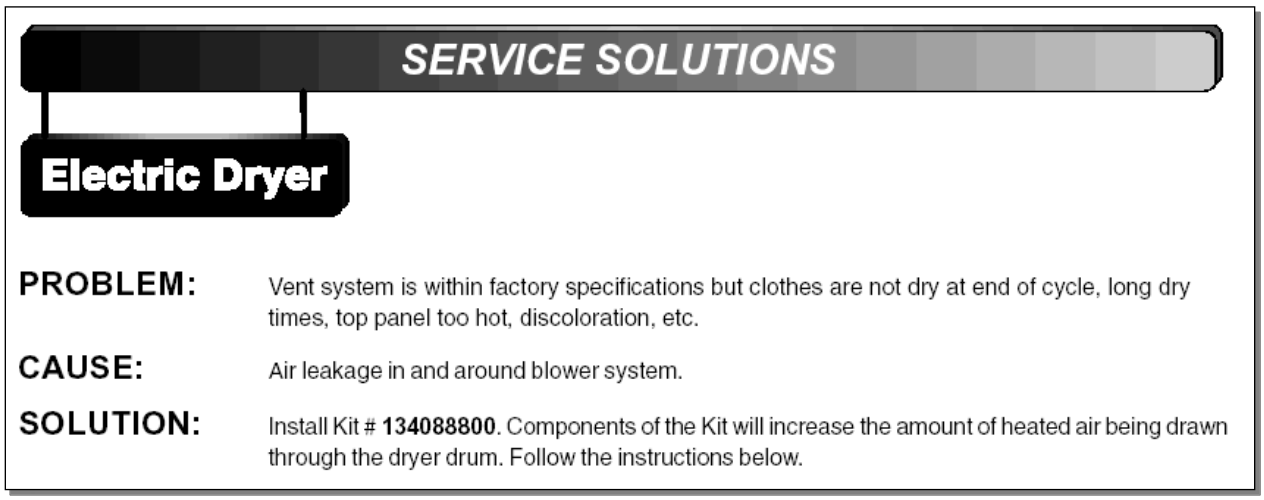
The statement highlighted above expresses that Electrolux is aware that "short cycling" means that the dryer is operating off of its high temperature limiting safety device as opposed to its operational thermostat. This "short cycling" is manifested by extended drying times. The service bulletin goes on to describe four potential defects of the dryer components that should be assessed by the technician when diagnosing the cause of the extended drying times, including leaks at the door seal, drum glide or seal, seal between the trap duct and blower housing or a defective blower assembly. These defects are directly related to internal components and are independent of installation or maintenance issues that Electrolux typically blames as the only potential causes for reduced airflow within the dryer. And in the statement below, Electrolux warns servicers that vent restrictions are not the sole cause for large amounts of lint observed in the cabinet.



NOTE: The vent restriction problem will also cause a build-up of lint inside the cabinet of the Dryer. The fan will force lint out at the seams of the vent tube (inside the machine) and into the cabinet. This can be a **fire hazzard**. If you observe a large amount of lint inside the cabinet, this could be an indicator of a vent restriction. If the Dryer is operating normally and you can find no fault with the venting system, or anything else, the fault may lie elsewhere.

Electrolux Service Bulletin – November 2000, Page 17

Electrolux released a service bulletin in July 2001 that further addressed air leakage in and around the blower system that resulted in customer complaints of extended drying times. The fix moved the heater pan forward, added clips to better seal the trap duct to the front panel, and new gasket and adhesive materials to replace the seal between the trap duct and blower housing.



SERVICE SOLUTIONS

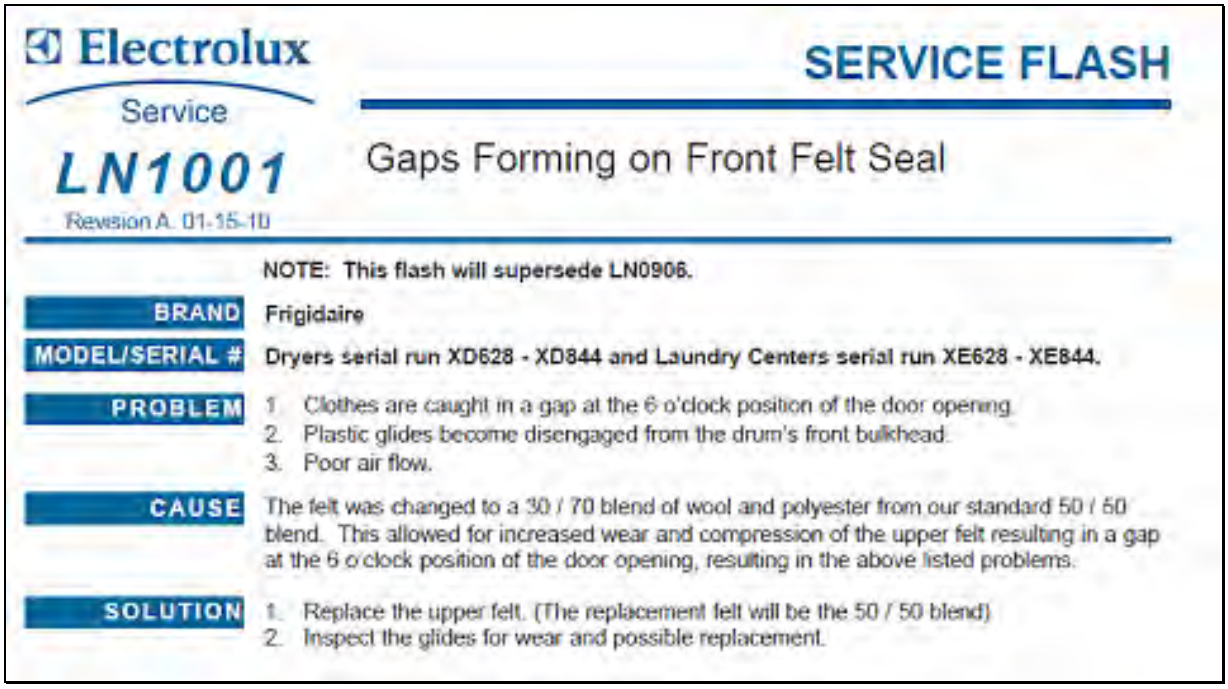
Electric Dryer

PROBLEM:	Vent system is within factory specifications but clothes are not dry at end of cycle, long dry times, top panel too hot, discoloration, etc.
CAUSE:	Air leakage in and around blower system.
SOLUTION:	Install Kit # **134088800**. Components of the Kit will increase the amount of heated air being drawn through the dryer drum. Follow the instructions below.

Electrolux Service Bulletin – July 2001, Page 6

Electrolux has released service bulletins dating back to 2000 to alert the service providers to the fact that the front drum seal is deficient and can result in poor airflow, items being caught in the gap and the drum glides detaching. These bulletins are also included in **Appendix II.** In the November/December 2001 – Issue #11 Service Bulletin, the original front drum glides/seal was modified to "Improve the sound quality of the dryer". In the April 2003 – Issue #3 Service Bulletin, the felt seal was to be turned around to correct the problem of "Too large a gap between the felt and drum glide". In the December 2004 – Issue #9 Service Bulletin, the felt seal was replaced with a "new, thicker felt" to correct "the upper felt may compress causing a gap between the lower felt and drum glide". Below is the latest excerpt from the most recent Service

Flash, LN1001 from January, 2010 regarding "poor airflow" resulting from a change in the felt seal that resulted in gaps forming at the drum seal. It should be noted that the serial numbers listed on this particular service bulletin were produced between 2006 to 2008, but other service bulletins reflect time periods between 2002 to 2004 where this also occurred. This same condition also affected both freestanding dryers and laundry centers in these time periods, as the front drum seal materials were the same across all models manufactured in Webster City. See **Appendix II** for all Service Bulletins related to the front drum seal deficiency.



Electrolux

Service

SERVICE FLASH

LN1001

Revision A. 01-15-10

Gaps Forming on Front Felt Seal

NOTE: This flash will supersede LN0906.

BRAND	Frigidaire
MODEL/SERIAL #	Dryers serial run XD628 - XD844 and Laundry Centers serial run XE628 - XE844.
PROBLEM	1. Clothes are caught in a gap at the 6 o'clock position of the door opening. 2. Plastic glides become disengaged from the drum's front bulkhead. 3. Poor air flow.
CAUSE	The felt was changed to a 30 / 70 blend of wool and polyester from our standard 50 / 50 blend. This allowed for increased wear and compression of the upper felt resulting in a gap at the 6 o'clock position of the door opening, resulting in the above listed problems.
SOLUTION	1. Replace the upper felt. (The replacement felt will be the 50 / 50 blend) 2. Inspect the glides for wear and possible replacement.

Example Service Bulletin from Electrolux on January 15, 2010

Electrolux's documentation for models they consider "Good and Better Models", which are those models equipped with an electronic console, contain further lists of contributing factors for reduced airflow in the dryer. These "Good and Better Models" contain a circuit board with integrated diagnostics that monitors for repeated activation of the high limit temperature safety over a given period, an effect of reduced airflow through the dryer. There are numerous models of "Good and Better Models". The Operating Instructions for each model family has a depiction of the electronic console, instructions on the settings and features and also references the error code indicators accompany an error caused by reduced airflow that a user can refer to and correct

themselves. These include emptying the lint from the lint screen, washing the lint screen to remove dryer sheet residue, cleaning the exhaust system to remove any exhaust blockage and reducing load size so that the drum is not overloaded. Similarly, each "Good and Better Model" is provided with a Dryer Tech Data Sheet within the cabinet for the purposes of servicer (Also included in the Service Manual for "Good and Better Models"). This document further defines the "E8C" error code that is a result of the high limit safety tripping too many times as a result of poor airflow through the dryer. It lists conditions the servicer should check for and correct, mostly involving the dryer's components and not user-related issues. These internal dryer issues include checking for air leaks around the air duct (trap duct), broken blower fan blades, worn or loose drum seals and the door seat not seated correctly. The excerpts below from the Operating Instructions and Dryer Tech Data Sheet for the "Good and Better Models" further support that there are numerous conditions within a dryer that can cause or contribute to reduced airflow within a dryer that cannot typically be ruled out with any degree of scientific certainty by physical examination of a dryer during post-fire analysis. In most cases, the dryer components listed in the Dryer Tech Data Sheet are too badly damaged to accurately assess their pre-fire conditions.

ERROR CODE CHART

If the dryer stops, the status lights flash and the signal beeps, an error has occured. Press PAUSE/CANCEL. Consult the Error Code Chart below or the "Avoid Service Checklist" in the Owner's Guide for the possible cause and solution. Make correction, then select a cycle and press START. If the dryer stops, status lights flash again and the beeping continues, please contact service for assistance.

Error Code	Error	Possible Causes	Solutions
4 beeps	Dryer ran too long	Lint filter blocked. Ventilation system clogged. Dryer overloaded.	Remove lint; wash lint filter to remove softener sheet residue. Clean out ventilation system. Reduce load size.
6 beeps	Push button does not function	Push button held too long or wedged in the control panel.	Press buttons lightly and release. Disengage button.

Error Code Excerpt from the Operating Instructions, P/N 134420600C
5.75 Cu. Ft. Dryer Gas & Electric Good and Better Models

E8C	Too many trips in a period of time.	The safety (high limit) thermostat has tripped too many times within a certain period of program time.	Check for blocked lint filter, blocked exhaust, air leaks around air duct, broken blower fan blades, worn or loose drum seals, dryer installed in closet with solid doors or door seal not correctly seated.

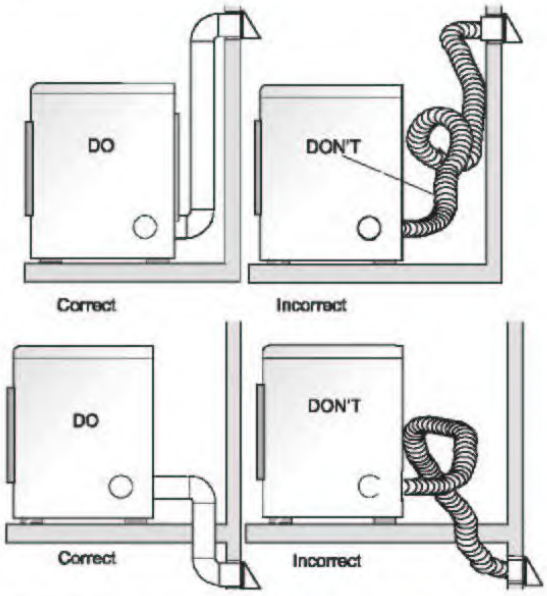
Error Code Excerpt from the Dryer Tech Data Sheet, P/N 134509400A (0501)
5.75 Cu. Ft. Dryer Gas & Electric Good and Better Models

External Exhaust Components

Electrolux will often cite deficiencies in the exhaust systems, such as non-compliance with manufacturer's instructions regarding the length of duct or type of materials used. Electrolux will make these contentions regardless of the actual venting efficiency of the exhaust ducting as it was installed. For example, a dryer vented using an eight foot single section of flexible foil transition duct connected to an exterior vent hood would be against manufacturer's instructions even if the duct is fully expanded, contained no kinks, and provided greater venting efficiency than the maximum allowable installation of 44 feet of rigid metal duct with two 90° elbows.

In their Installation Instructions, Electrolux "recommends" the method of installation using a table as a guide. The table allows for a certain length of duct and number of elbows, depending on the type of hood used and material that the duct is constructed of. On this same page of the Installation Instructions, Electrolux recognizes that installations can be different. They provide additional instructions that the exhaust system is acceptable so long as the backpressure is no greater than 0.75 inches of water column. The Wright Group has conducted testing on numerous different configurations of exhaust installations and found that the "recommended" setup according to the chart does not come close to the maximum allowable backpressure. One of our tests used a configuration of 72 feet of duct with eight 90° elbows and only reached 0.70 inches of water column backpressure. The Wright Group's testing proved that even if the dryer is vented using a flexible duct installed in the correct manner, it will not cause a greater amount of measured back pressure in the form of an exhaust restriction than one vented with the use of rigid or semi-rigid duct.

An example of the Installation Instructions with highlighted is included below:



CAUTION - ***Risk of Fire - A clothes dryer must be exhausted outdoors*** Do not exhaust dryer into a chimney, a wall, a ceiling, an attic, a crawl space or any concealed space of a building. A clothes dryer produces combustible lint. If the dryer is not exhausted outdoors, some fine lint will be expelled into the laundry area. An accumulation of lint in any area of the home can create a health and fire hazard. ***The dryer must be connected to an exhaust outdoors.*** Regularly inspect the outdoor exhaust opening and remove any accumulation of lint around the outdoor exhaust opening and in the surrounding area.

WARNING ***Do not allow combustible materials (for example: clothing, draperies/curtains, paper) to come in contact with exhaust system.*** The dryer ***MUST NOT*** be exhausted into a chimney, a wall, a ceiling, or any concealed space of a building which can accumulate lint, resulting in a fire hazard.

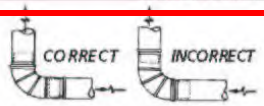
WARNING ***Exceeding the length of duct pipe or number of elbows allowed in the "MAXIMUM LENGTH" charts*** can cause an accumulation of lint in the exhaust system. Plugging the system could create a fire hazard, as well as increase drying times.

WARNING ***Do not screen the exhaust ends of the vent system, nor use any screws, rivets or other fastening means that extend into the duct and catch lint to assemble the exhaust system.*** Lint can become caught in the screen, on the screws or rivets, clogging the duct work and creating a fire hazard as well as increasing drying times. Use an approved vent hood to terminate the duct outdoors, and seal all joints with duct tape. All male duct pipe fittings ***MUST*** be installed downstream with the flow of air.

WARNING ***Explosion hazard. Do not install the dryer where gasoline or other flammables are kept or stored.*** If the dryer is installed in a garage, it must be a minimum of 18 inches (45.7 cm) above the floor. Failure to do so can result in death, explosion, fire or burns.

Number of 90° Turns	MAXIMUM LENGTH of 4" (10.2 cm) Dia. Rigid Metal Duct — VENT HOOD TYPE (Preferred) 4" (10.2 cm)	Louvered	2½" (6.35 cm)
0	60 ft.(18.28 m)		48 ft.(14.63 m)
1	52 ft.(15.84 m)		40 ft.(12.19 m)
2	44 ft.(13.41 m)		32 ft. (9.75 m)
3	32 ft.(9.75 m)		24 ft. (7.31 m)
4	28 ft.(8.53 m)		16 ft. (4.87 m)

Number of 90° Turns	MAXIMUM LENGTH of 4" (10.2 cm) Dia. Flexible Metal Duct — VENT HOOD TYPE (Preferred) 4" (10.2 cm)	Louvered	2½" (6.35 cm)
0	30 ft. (9.14 m)		18 ft. (5.49 m)
1	22 ft. (6.71 m)		14 ft. (4.27 m)
2	14 ft. (4.27 m)		10 ft. (3.05 m)
3	NOT RECOMMENDED		



INSTALL MALE FITTINGS IN CORRECT DIRECTION

In installations where the exhaust system is not described in the charts, the following method must be used to determine if the exhaust system is acceptable:

1. Connect an inclined or digital manometer between the dryer and the point the exhaust connects to the dryer.
2. Set the dryer timer and temperature to air fluff (cool down) and start the dryer.
3. Read the measurement on the manometer.
4. The system back pressure ***MUST NOT*** be higher than 0.75 inches of water column. If the system back pressure is less than 0.75 inches of water column, the system is acceptable. If the manometer reading is higher than 0.75 inches of water column, the system is too restrictive and the installation is unacceptable.

Although vertical orientation of the exhaust system is acceptable, certain extenuating circumstances could affect the performance of the dryer:

- Only the rigid metal duct work should be used.

4

Installation Instructions

GE Version of Warnings & Instructions

Electrolux has double standards when it comes to exhaust recommendations. Electrolux dryers sold under their own Frigidaire brand name have identical exhaust characteristics as the dryers they make for General Electric, but each brand has a differing set of instructions as to the type of vent materials allowed. Some General Electric User Guides produced by Electrolux expressly allows for the use of flexible foil transition ducts, while the Frigidaire manuals for the same basic dryer recommend against the use of flexible foil transition ducts.

Additional Installation Instructions

If all rigid metal duct cannot be used, then flexible all-metal venting can be used, but it will reduce the maximum recommended duct length. In special installations when it is impossible to make a connection with the above recommendations, then *UL-listed clothes dryer transition duct* may be used as transition venting between the dryer and wall connection only. The use of this ducting will affect drying time.

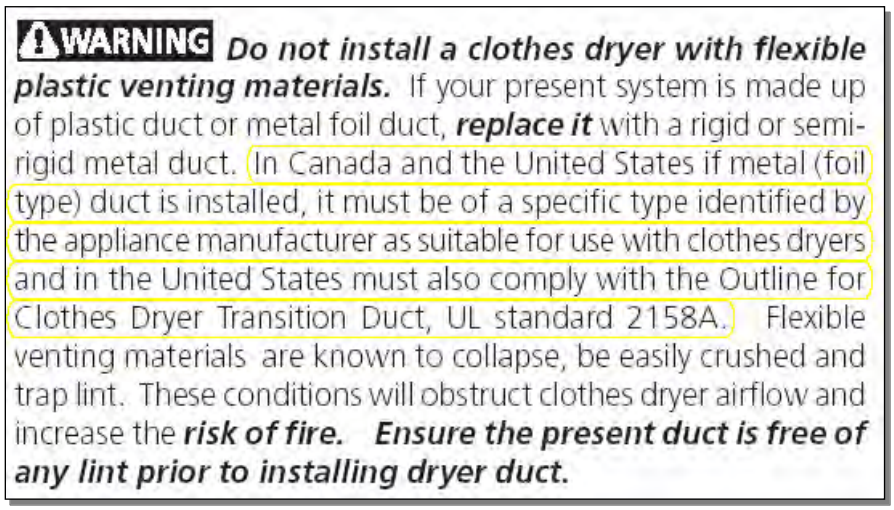
If flexible transition duct is necessary, only UL-listed duct identified for use with clothes dryers is approved.

Excerpt From GE Dryer Owners Guide & Installation Instructions

Recent Variations of Installation Instructions Allowing for Flexible Foil Ducts

Newer variations of the Electrolux manuals for their clothes dryers contains allowances for the use of flexible foil transition ducts that are approved under UL 2158A, the Standard for Clothes Dryer Transition Ducts. These allowances appear in Installation Instructions for numerous dryer model lines since approximately 2008, including those in the Affinity line. The Affinity line was at one time comprised of both the subject ball-hitch design, which has now been discontinued in favor of the preferable bulkhead design. But regardless of the design type, the installation

instructions for all of these dryers manufactured by Electrolux specifically allow for the use of a flexible foil duct, as evident from the following excerpt from the Installation Instructions.



WARNING ***Do not install a clothes dryer with flexible plastic venting materials.*** If your present system is made up of plastic duct or metal foil duct, ***replace it*** with a rigid or semi-rigid metal duct. In Canada and the United States if metal (foil type) duct is installed, it must be of a specific type identified by the appliance manufacturer as suitable for use with clothes dryers and in the United States must also comply with the Outline for Clothes Dryer Transition Duct, UL standard 2158A. Flexible venting materials are known to collapse, be easily crushed and trap lint. These conditions will obstruct clothes dryer airflow and increase the ***risk of fire.*** ***Ensure the present duct is free of any lint prior to installing dryer duct.***

Excerpt From Frigidaire Installation Instructions,
Model GLGQ2152EE1, Doc. Date: 04/08

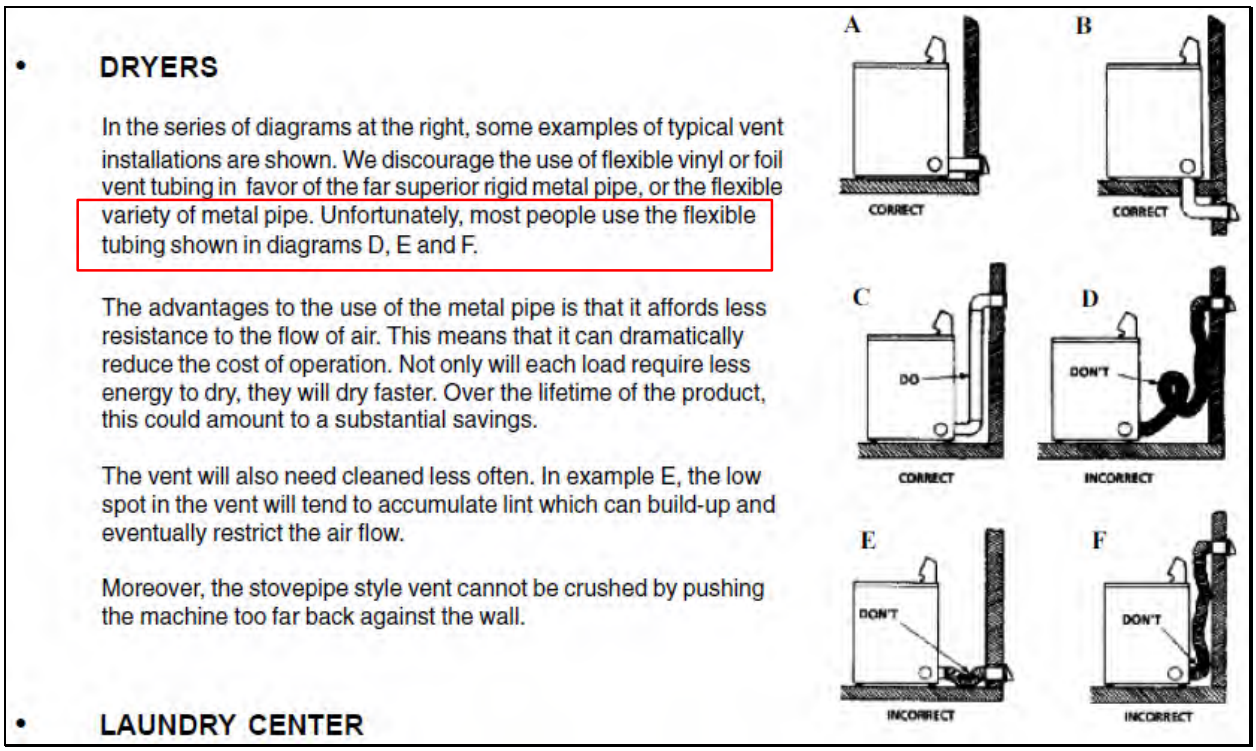
Electrolux Distributes Flexible Foil Dryer Vents

More notably, Electrolux itself has marketed and distribute these same flexible foil transition ducts that they prohibit the use of, under the Electrolux name. An exemplar of this duct was purchased at the same store where their dryers are sold. The packaging of the Electrolux brand flexible foil duct states that it is "universal" and "fits most brands". There is no instruction not to use flexible foil vent with any of the dryer brands manufactured by Electrolux, such as the subject dryer. The Electrolux packaging further states "UL listed clothes dryer transition duct gives you the assurance of Underwriters Laboratories, Inc."

Flexible Foil Transition Ducts Distributed by Electrolux

Electrolux Acknowledges Prevalent Use of Flexible Ducts

Electrolux has issued multiple service bulletins, including one in November of 2000 **(See Appendix II)** stating, "We discourage the use of flexible vinyl or foil vent tubing in favor of the far superior rigid metal pipe, or the flexible variety of metal pipe. Unfortunately, most people use the flexible tubing shown in diagrams D, E and F." This indicates that Electrolux has been aware of the fact that it is foreseeable that most of their dryers will be installed using flexible exhaust ducts, notwithstanding recommendations to the contrary in the installation instructions.



- **DRYERS**

In the series of diagrams at the right, some examples of typical vent installations are shown. We discourage the use of flexible vinyl or foil vent tubing in favor of the far superior rigid metal pipe, or the flexible variety of metal pipe. Unfortunately, most people use the flexible tubing shown in diagrams D, E and F.

The advantages to the use of the metal pipe is that it affords less resistance to the flow of air. This means that it can dramatically reduce the cost of operation. Not only will each load require less energy to dry, they will dry faster. Over the lifetime of the product, this could amount to a substantial savings.

The vent will also need cleaned less often. In example E, the low spot in the vent will tend to accumulate lint which can build-up and eventually restrict the air flow.

Moreover, the stovepipe style vent cannot be crushed by pushing the machine too far back against the wall.

- **LAUNDRY CENTER**

Example Electrolux Service Bulletin from November 2000

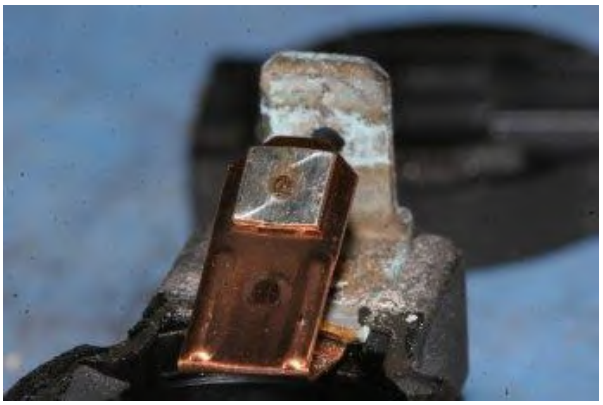
Flexible foil transition ducts that meet the minimum standards of UL 2158A, for Clothes Dryer Transition Ducts, are readily purchased at appliance dealerships across the United States. These flexible ducts are used not only by homeowners, but also by appliance delivery and service people that install dryers on behalf of those homeowners who do not install the dryers themselves. In paying for the additional service to have their dryer delivered and installed at their home, homeowners would expect that the installer would use a safe and appropriate external vent when installing the dryer. In most cases, the professional installer is apt to ignore the recommendations in the installation instructions and use a flexible vent, such as the one the Electrolux itself has marketed.

Temperature Limiting Safety Devices

Changes in airflow from restrictions and air leakage not only affect the efficiency of ventilation, but also alter the performance characteristics of the appliance. This is a result of a significant reduction of airflow behind the drum that causes increased temperatures in the heater pan. As a result of decreased airflow in that location, the high limit safety device (located at the one

o'clock position of the heater housing or diffuser pan in an Electrolux dryer) will be heated and will open a set of energized contacts. When this occurs, the bi-metallic disk pushes against a pin, which separates the moveable contact from the fixed contact. As the contacts separate, a "parting arc" is formed until the contacts separate far enough to interrupt the arc. The result of the contact separating is that power is disrupted to the heat source, and the flame is extinguished or heating element de-energized. The dryer fan remains running, removing the heated air and allowing the high limit safety switch to reset once the bi-metallic disk cools and the moveable contact returns to its normally closed position against the fixed contact. If the cause of the insufficient airflow is not corrected the clothes dryer will continue to operate, however, the dryer will be effectively controlled by its high limit safety device instead of the operational thermostat, which will not operate due to the lower temperatures at that location. The result will be that the burner will continue to cycle ON and OFF, but the ON cycle will be reduced, because the heat produced will not be vented from the appliance as designed.

Physical evidence of this condition can be found by a visual examination of the contact surfaces of the high limit safety device. The previously described parting arc creates temperatures of thousands of degrees or more. When this occurs, the surface of the contact is melted. As repetition of the parting arc occurs, the surface is melted again and again. Byproducts of the arc include vaporization of the metal contact material, which is observed in the form of a blackened or discolored area at the center of the contact, followed by pitting and eventually deformation of the contact surfaces as repeated cycling occurs. By examining the contacts, one can determine if the dryer had a reduced airflow condition that caused the high limit safety device to activate, and also can gauge the number of times this safety device cycled.



Un-Cycled Contact

Heavily Cycled Contact

DESIGN ANALYSIS AND DESIGN ALTERNATIVES:

It is our opinion that the subject Electrolux dryer is defective in its design. Through the use of principles accepted in engineering, design and manufacturing communities, Basic Safety Engineering principals should have been employed during the design of the subject dryer. Failure Mode and Effect Analysis, another principal shared between design/manufacturing and fire investigation communities was used to not only evaluate the cause of the fire as listed above, but also to analyze the subject design as it relates to hazards and propose alternative designs to improve the safety of the appliance without removing the functionality or decreasing efficiency. The Wright Group began by analyzing the three most common dryer designs, comparing differences in those designs and determining if the subject Electrolux dryer could have been designed to reduce or eliminate the various potential failure modes and their associated fire hazards.

Basic Concepts of Safety Engineering

It is the duty of the manufacturer of every product available to the general public to make sure it is not only constructed to the required standards, but is also designed and manufactured in ways that make the product safe to the end user. Safety Engineering is a term used to describe the basic principles behind the design of a product and is subject to re-evaluation throughout the production life of that product. These basic principles are as follows:

1. **Identify the Hazards:** All available background information regarding the proposed design should be collected, reviewed and analyzed. Important background information would include, for example, the foreseeable use and misuse of the product, the environment in which the product is expected to be used and the capabilities and behaviors of the users. While the review of codes and standards are also important, they generally have serious limitations that the designer needs to be aware of. For instance, a standard cannot address every possible design situation that may be encountered, or the standard writing process (negotiation and compromise) can severely weaken the safety content of a standard.

   Many hazards can be readily identified, such as those that create cutting, pinching or crushing hazards. Obviously, any components that generate heat should be evaluated as to the risk of fire and burn hazards. But there are also hidden hazards that need to be accounted for during the safety evaluation process. A common approach is the "what if" analysis, utilizing a series of questions focusing on each component's manufacturing processes, materials, maintenance, wear and tear, operator error, operator capabilities, etc. The types of questions that should be posed in the "what if" analysis might include: "What if the component does not operate as intended?" or "What if the user forgets to perform routine maintenance?"

2. **Eliminate or Reduce the Risk to an Acceptable Level:** Once all the hazards have been identified, the first priority is to eliminate or reduce the risk to an acceptable level. There are two ways to accomplish this. The first is to design the hazard out of the system. An example would be using a ramp instead of steps to eliminate a trip hazard. If a design alternative doesn't eliminate the hazard or provide adequate risk reduction, then an engineered guard or safety device should be considered as the secondary alternative. An example of a guard would be a blade guard on a table saw that reduces the risk to the operator from injuring themselves by inadvertently contacting the rotating saw blade. An example of a safety device would be a tip switch on a portable electric heater that

eliminates the possibility of a fire occurring if the operating heater falls over onto combustible materials.

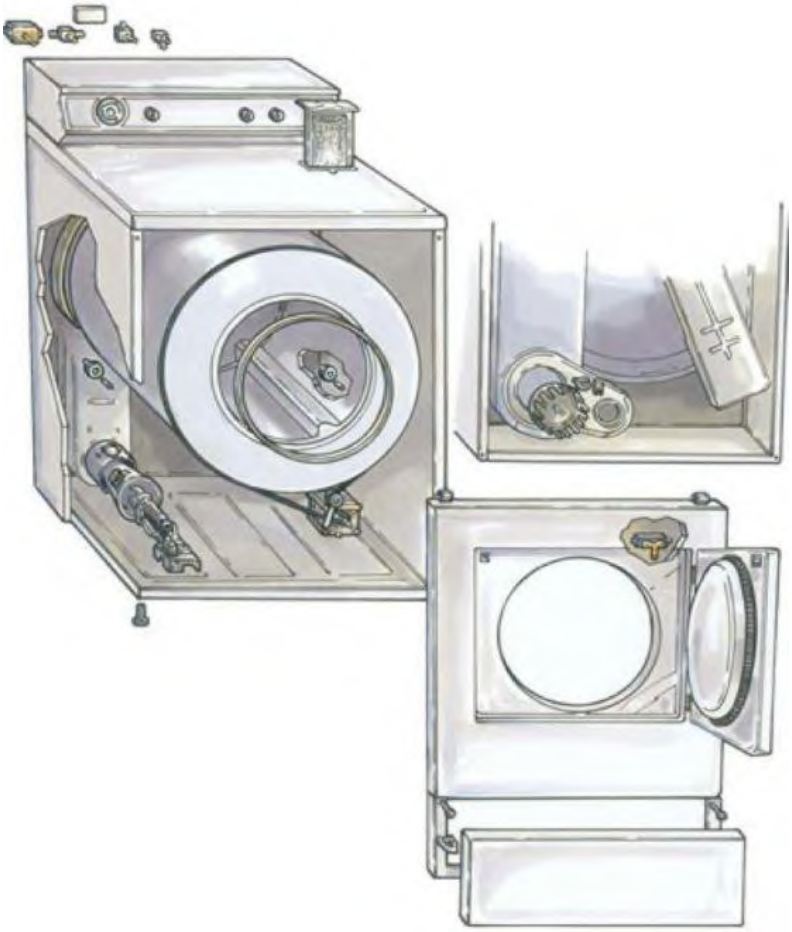
3. **Provide Adequate Warning and/or Written Instruction:** In some cases it is not possible to achieve adequate risk reduction by a design change or by providing suitable engineered guards or safety devices. Only after exhausting those avenues is it appropriate to rely on the use of warnings and or written instructions. A warning can be either active, in the form of a visual indicator or audible alarm, or passive, in the case of warning labels. A warning label or sign should alert the user to the specific hazard, the seriousness of the hazard, the consequences of interaction with the hazard and the ways to avoid the hazard. ANSI standard Z535 covers the required details of the warning label, such as size, color, placement, wording, etc. A warning should never be used in place of an alternative design or an engineered guard or safety device.

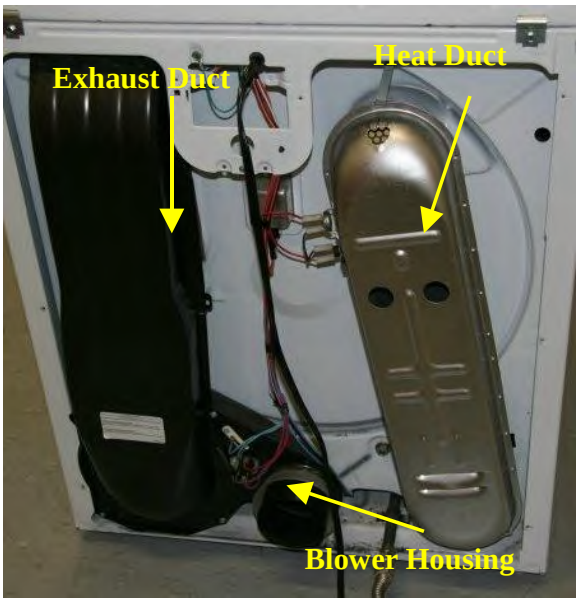
Comparison of Various Dryer Designs:

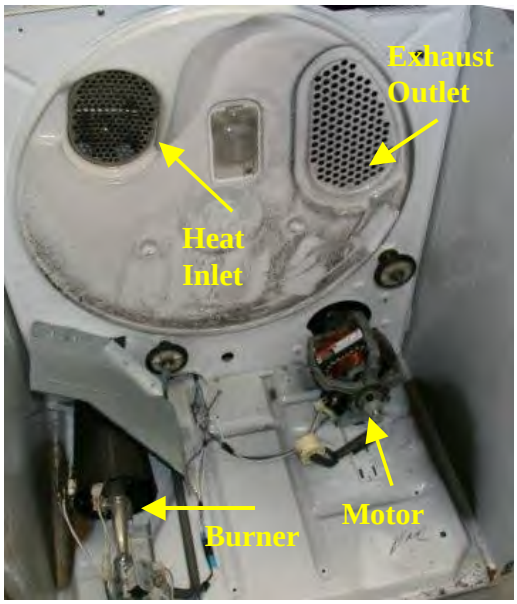
All clothes dryers contain inherent heat sources to produce the warm air needed to dry the wet clothing, either in the form of gas burners or electric resistive heating coils. They all contain motors, both to rotate the drum, to draw air over the heat source using negative pressure, and to exhaust moisture and lint laden air from the dryer using positive pressure. Variations in design and components of the major design types, account for the differences in the efficiency in which they dry clothes and their ability to manage the byproducts of the drying process, i.e. moisture-laden air and lint.

Whirlpool Design

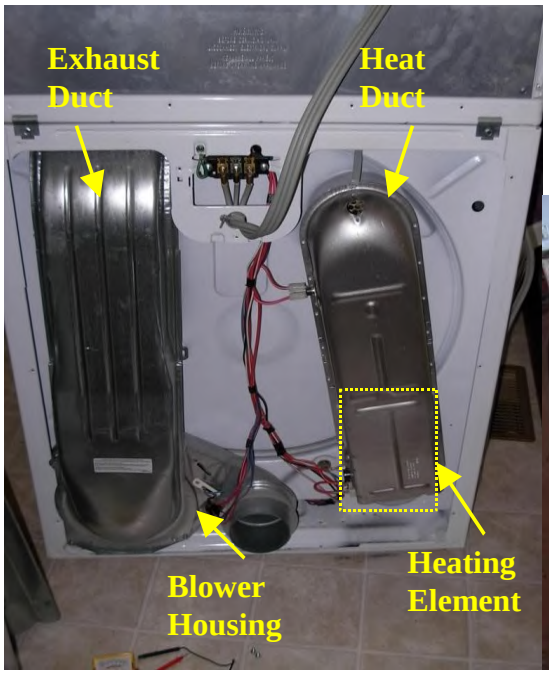
Whirlpool has been manufacturing clothes dryers since the 1950's. Whirlpool's original design of clothes dryers uses a two-piece drum, of which the stationary rear wall of the drum is incorporated to an inner dividing wall within the main cabinet. This is known as the bulkhead. The cylinder of the drum rotates on two drum rollers at the rear, and on drum glides at the front. Warm air is drawn into the drum through a vertical heat duct located in the compartment between the bulkhead and the rear exterior panel of the cabinet, and enters through a small group of perforations located in the upper left section of the rear wall of the drum. In the majority of the Whirlpool electric dryers, the heating element is located within the vertical heat duct itself. In Whirlpool gas dryers, the burner is located below the drum in the base of the main compartment and is connected to the vertical heat duct. The moisture-laden air and lint is similarly exhausted from the drum through a separate group of perforations in the bulkhead and into the vertical exhaust duct, also installed in the compartment behind the drum. The blower housing and fan impeller are located at the base of the vertical exhaust duct. The lint screen is also located in the exhaust duct, and the lint screen is removed through an access door on the top of the dryer.

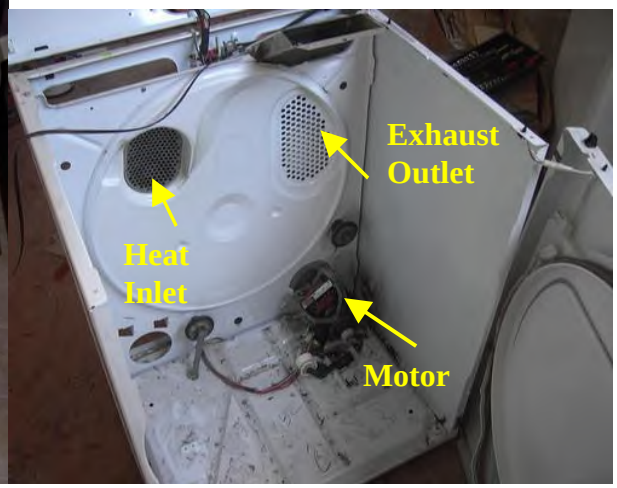






Whirlpool - Gas Dryer Design





Whirlpool - Electric Dryer Design

In the Whirlpool dryers, lint is primarily collected in the exhaust duct where the lint screen is positioned. A significant collection area of lint is typically observed at the base of the exhaust duct, at the 90° turn where the duct interfaces with the fan impeller. There are no ignition sources near the lint screen or at the base of the exhaust duct, as the fan motor is divided from the fan impeller by the metal wall of the duct and rear bulkhead. It should be noted that the exhaust duct is constructed entirely of metal and not of plastics that would add additional fuels should a fire occur.

The standard capacity electric models have their heating elements compartmented within the vertical heat duct, which runs upward within the compartment to the rear of the drum behind the bulkhead. The base of this heat duct is open, allowing not only cool air to be drawn in through the bottom for it to be warmed by the heating element, but also allows any lint that may escape into the vertical heat duct from the drum to fall into the base of the cabinet. There is no way for the lint to accumulate within the vertical heat duct and come into proximity with the heating element.

Some lint does escape the felt drum seals at the front and rear of the drum cylinder, and will collect within the base of the cabinet but generally does not accumulate to any appreciable depth. The motor and wiring are the only inherent ignition sources in the base of the cabinet in the majority of the electric models, with the gas models and high capacity electric models having the gas burner or heater assembly in the base of the cabinet. This allows for a slight potential for a lint fire, but because of the limited amount of lint that accumulates in the base of the cabinet and the fact that all of the components are metal, any lint ignition that occurs in the base of the cabinet cannot spread to the clothing in the drum or out of the cabinet.

Unlike the subject Electrolux dryer, there is no major accumulation of lint near the heat source and the heat source is located further from the laundry load in the drum. This Whirlpool design uses better compartmentalization than the Electrolux design to separate the lint from the heat sources. The two piece bulkhead style drum and duct design does not allow for any lint to accumulate in between the heat source and the secondary spread fuels such as the laundry load and lint that is collected at the lint filter. For these reasons, the Whirlpool design is a better

design alternative in the prevention of lint related fires. In electric models, the location of the heating element within a duct and the employment of a stationary rear wall of the drum/bulkhead completely eliminate fires caused by bearing failures, as a shifting drum can never contact the heating element. The reduced number of perforations on the rear bulkhead and increased linear distance between those perforations and the heating element virtually eliminates fires caused when foreign objects contacts the heating element. In addition, most of the models manufactured using this Whirlpool design use very few plastic components and both the vertical heat duct and exhaust ducts are metal.

It should be noted that Whirlpool has purchased Maytag and no longer uses the design described above, but rather the Maytag design that will be discussed in the next section.

Maytag Design

Maytag has been using the following design of dryer since the 1960's. This is a hybrid design that incorporates features of both the Whirlpool design, as discussed above, and the Electrolux/General Electric design, which will be discussed next. These dryers have the same two-piece drum (bulkhead design) and vertical heat duct features of the Whirlpool, but the exhaust is drawn through the lint filter and trap duct assembly similar to that of the Electrolux/GE dryers. The drum cylinder is fully supported at the front and rear by bearing wheels. In both electric and gas models, the gas burner assembly or electric heating element are located in the lower right section of the base of the cabinet, and heated air is carried into the drum via the single vertical heat duct.